

STUDIES IN THE SYNTAX OF RELATIVE AND COMPARATIVE CLAUSES

by

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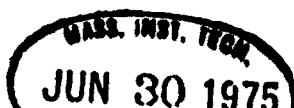
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ABSTRACT

This thesis is an investigation of certain aspects of the syntax of relative and comparative clauses. In chapter 1 I give a typological survey of relative clauses in the languages of the world. This chapter serves both to convey a general impression of what relative clauses are like in the languages of the world, and to establish certain phenomena that are of theoretical import. One of the most significant of these is that there are relative clauses that cannot be deep structure constituents with the NP they modify, but must be generated in the base at an unbounded distance from those NP. In Chapter 2 I examine comparative clauses, and integrate the material given with that presented for relatives. I first review the analysis of the heads of comparative clauses given by Bresnan (1973), making minor modifications and extensions, and motivating certain principles of rule application. I then show that comparative clauses, like relatives, cannot be uniformly treated as underlying constituents with their heads, but must be generable at an unbounded distance from these heads. Given the requisite underlying constituent structures, certain classical problems become unsolved, such as the cooccurrence relations between the complementizers of comparative clauses and the determiners of their heads. To solve these problems I introduce a theory of abstract relations holding between the constituents of phrase-markers. The relations are constrained by a system of language-universal well-formedness conditions. The system explains a variety of phenomena common to relative and comparative clauses, and thus constitutes a theory of the determiner complement system as proposed by Bresnan (1972).

Thesis supervisor: John R. Ross

Title: Professor of Modern Languages and Linguistics

Meditatio

When I carefully consider the curious habits of dogs
I am compelled to conclude
That man is the superior animal.

When I consider the curious habits of man
I confess, my friend, I am puzzled.

-- Ezra Pound

To Cindy

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Needless to say, I, rather than these scholars, am responsible for the many faults of this work.

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Introduction

Bresnan (1972) suggested that much of the grammar of sentence-embedding could be divided into two areas: the 'predicate complement' system and the 'determiner complement' system. Predicate complements serve in syntactic structure as complements to nouns, verbs and adjectives, and correspond in logical structure to the arguments of predicates. Determiner complements are the relative and comparative clauses. They appear to bear some sort of relationship to determiners, and in logical structure to restrict the variables bound by the operators corresponding to these determiners. In this study I will take two different approaches toward the syntax of the determiner complement system.

In chapter one I conduct a typological survey of relative clauses in the languages of the world. I direct most of my attention to determining the varieties of constituent structure relations between relative clauses and their heads. I ultimately discern three major types: headless relatives, that have no head; embedded relatives, which may occur either attached to their head or extraposed; and adjoined relatives, which appear at the beginning or the end of the matrix. The distinction between extraposed relatives and adjoined relatives that follow their matrix will not emerge until the discussion of adjoined relatives in section 1.1.3., and will be further developed in chapter

two.

The major findings of theoretical interest are that the various types are essentially derived from themselves in underlying structure. Headless relatives lack heads in underlying structure, and extraposed and adjoined relatives are not generated as underlying constituents with their heads, but in their surface positions. I propose that headless relatives are introduced by a rule $NP \rightarrow \bar{S}$, embedded relatives on heads are introduced by $NP \rightarrow NP \bar{S}$ and $NP \rightarrow \bar{S} NP$, extraposed relatives are introduced by $S \rightarrow S \bar{S}$, and adjoined relatives are introduced by $\bar{S} \rightarrow COMP (\bar{S}) S (\bar{S})$. -The principal evidence for the claim that extraposed and adjoined relatives are generated in the base in their surface positions is that they both may have multiple heads.

I also treat of the various things that happen to the "relative" NP (wh Marking, Deletion, etc.) in the relative clause, and discuss some possible evidence that the heads of relative clauses are extracted from within them as a copy of the relative NP. Many other matters are examined throughout as well.

In the course of the chapter I discuss numerous theoretical issues, but the primary focus is descriptive and suggestive rather than theoretical. There are obviously great limitations on the depth and breadth of the coverage of individual languages. Furthermore, reduced relatives will not be treated, and the structures most closely

related to relative clauses, interrogative and focus constructions, will be ignored. Despite these limitations, I believe that the chapter provides a valid and useful picture of the relative clause construction in universal grammar.

In chapter 2 I examine comparative clauses in English, integrating the material with selected aspects of the work in chapter one, and taking a considerably more theoretical standpoint. I first examine Bresnan's (1973) analysis of the head constituents of comparative clauses, such constituents as as good a linguist in he is as good a linguist as she is. I modify the analysis in certain respects, and formulate the crucial rule of 'QP Raising' that Bresnan leaves unformulated. I also extend the analysis to accomodate the 'indefinite comparative' construction of the more you study, the less you know.

In the course of these efforts I motivate certain theoretical principles on the basis that they reduce the range of data needed to determine the correct analysis of grammatical phenomena. Some are principles of rule-application that cause rules motivated by simple paradigms to apply correctly in more complex cases. There is also a convention making certain potential derived constituent structures ungrammatical. This rules out an analysis which by the evaluation measure is preferred for a simple paradigm over a more complex analysis that is in fact the correct one when more data is considered.

The claims that certain analyses are minimal are based on possibly erroneous inspection rather than rigorous proof, and are aided by the somewhat overly strong assumptions that the data which is taken to determine the grammars includes specifications of certain strings as ungrammatical, and provides the deep structures for those that are grammatical. Despite the lack of rigour and the overly strong nature of the assumptions, the discussion shows that it is possible to argue from explanatory adequacy with a considerable higher degree of explicitness than is usually attempted (with certain exceptions, such as some recent work by Hamburger, Culicover and Wexler).

Further implications are that Bach's universal rule hypothesis, suggested by Peters (1972) as a solution to the projection problem, the problem of getting linguistic data to determine grammars and thereby project the given data to predictions of more data, may be an unnecessarily violent step. One can get considerable results from imposing highly substantive restriction on linguistic structure without dictating an inventory of rules. One might, for example, consider a restriction requiring that an S (a) be coordinate (b) be a predicate nominal or adjective construction (c) or otherwise have exactly one verb.

I next show that the traditional assumption that comparative clauses in English are generated in the determiners of the QP they modify cannot be maintained. I show that ordinary comparatives correspond to embedded

relatives, being introduced by a rule $X^3 \rightarrow X^3 \bar{S}$ (N^3 being, for example, an X-bar notation for NP) when they appear attached to a head, and by $S \rightarrow S \bar{S}$ when they appear extraposed. I then show that the indefinite comparative mentioned above corresponds to the adjoined relative clause.

I finally develop, in rather tentative and incomplete form, a solution to the classical problem of the selection restrictions between degree particles and complementizers of comparative and result clauses, and of similar restrictions involving relative clauses and their heads. The solution takes the form of a system of extra-constituent structure 'global relations' between degree particles and NP determiners and the complementizers of relative and comparative clauses. As much of the theory of this system as I formulate is common to both comparative and relative clauses, thus supporting Bresnan's claim that they constitute a unified system, the determiner complement system.

I close by using the mechanisms developed to formulate some principles that have the effect of reducing the database needed to determine correct analyses for relative clauses, thus returning to the problem of projection taken up at the beginning of the chapter.

1. The Typology of Relative Clauses:¹ In this chapter I offer a typological survey of relative clauses in the languages of the world. The genesis of this work is the observation of Bach (1965) that relative clauses differ less between languages than one might expect. It appears that a limited number of options are being put together in a limited number of ways. The goal of this study is then to present a broad picture of what relative clauses are like in the languages of the world.

What is a relative clause? For the purposes of this chapter, a relative clause is any clause with approximately the semantic structure and function of a relative clause (restrictive or nonrestrictive) in English. I shall sharpen this rough criterion somewhat by saying that a relative clause is a subordinate clause that modifies a constituent external to it by virtue of containing a constituent that is in some sense semantically equivalent to the modified constituent. I shall call the modified constituent the head constituent, and the equivalent constituent within the relative clause the relative constituent. In the case where both are NP, I shall designate them as NP_{hd} and NP_{rel} . The relative clause and its matrix clause I shall designate as S_{rel} and S_{mat} . In addition to being vague, this account is also too narrow: we shall find in section 1.1.2 a kind of relative clause that has no head constituent. But in spite of its deficiencies, this account permits work to begin.

To improve on my intuitive description of the semantic structure and function of relative clauses it would be necessary to adopt some particular theory of the semantics of natural languages. I shall not do so here, but refer the reader to (Keenan 1972), (Montague 1974) and (Hintikka 1974) for some interesting alternatives. On the basis of the theoretical discussion of relative clauses that I will offer in chapter two I will provide a syntactic definition of the notion 'relative clause.'

Once one has made the initial observation that there do not seem to be terribly many types of relative clause constructions, an attempt to construct a systematic inventory of relative clause types is immediately justified. To the extent that there is inexplicably little variation in the syntactic structures used to express some kind of logical form, there is a possibility for narrowing linguistic theory, and therefore for achieving a better explanation of the possibility of learning languages.

This consideration is strengthened by the fact that the relative clause is a structure with extremely rich connections elsewhere in the theory of grammar. Some of the more prominent syntactic contributors are the determiner system of NP, the grammar of subordinate clauses, pronominalization, syntactic variables, and functional sentence perspective. On the semantic side

relativization is no less involved with other aspects of grammar, for example with variables, scope and binding; with coreference and with presupposition. Hence restrictions on relativization are likely to be reflections of more general restrictions of broad explanatory potency.

The primary purpose of this survey is to provide a background of information about diverse languages in order to convey a sense of what relativization is like in the languages of the world. I also wish, however, to suggest a general theory, which I develop gradually and informally in this chapter, and present more formally in the next.

The principal results of the survey are that some relative clauses do not have heads in underlying structure, and that others do not at any level of structure form constituents with their heads, but rather may be separated from them by an unbounded stretch of material. Most theories of relative clauses make crucial use of constituent structure relations between relative clauses and their heads in stating various rules and restrictions. For example, wh-Preposing rules for relative clauses are often given a form like (1):

$$(1) \quad W_1 - [_{NP} \text{ NP} - [_{S} W_2 - \text{NP} - W_3]] - W_2, \quad 2 = 4$$

| | | | | | |
|---|---|-----|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | 2 | 4+3 | ∅ | 5 | 6 |

To preserve an account of the rules and restrictions involving relative clauses in the face of the breakdown of constant constituent structure relations between relative clauses and their heads, I propose a theory of extra-constituent structure relations that identify the relative and modified constituents of relative clauses. These relations may be represented as systems of directed arrows drawn into trees connecting nodes. A more formal treatment will be given in chapter 2.

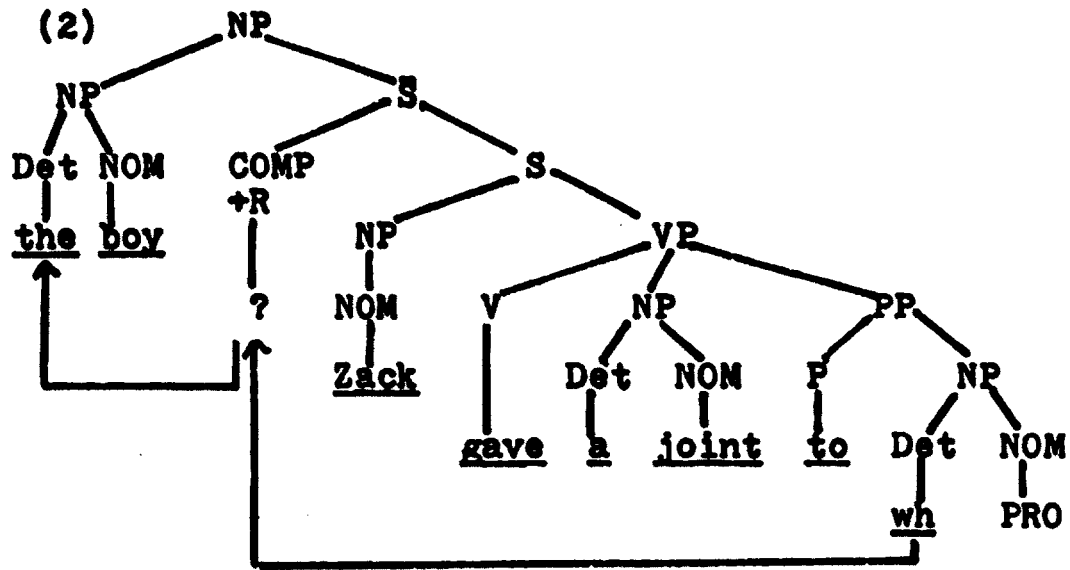
I develop the theory as an extension of Bresnan's theory of complementizers (Bresnan 1970, 1972, 1974 a). Bresnan hypothesizes that clause are introduced by a rule $\bar{S} \rightarrow \text{COMP } S$ (or by its trivial variant $\bar{S} \rightarrow S \text{ COMP}$) where COMP is the category of the clause-introductory particles that Bresnan calls complementizers and hypothesizes to determine important aspects of the semantic interpretation of main and subordinate clauses. Important among the complementizers recognized by Bresnan are the that that introduces many finite clauses, the for that introduces infinitives, the abstract 'Q' that Baker (1968, 1970) proposes to introduce questions and indirect questions, and the than and as that introduce comparative (and some relative) clauses.

I propose that universal grammar provides a feature of COMP, 'R,' that is specified as [+R] on the COMP of relative clauses. A preterminal that is [+COMP +R]

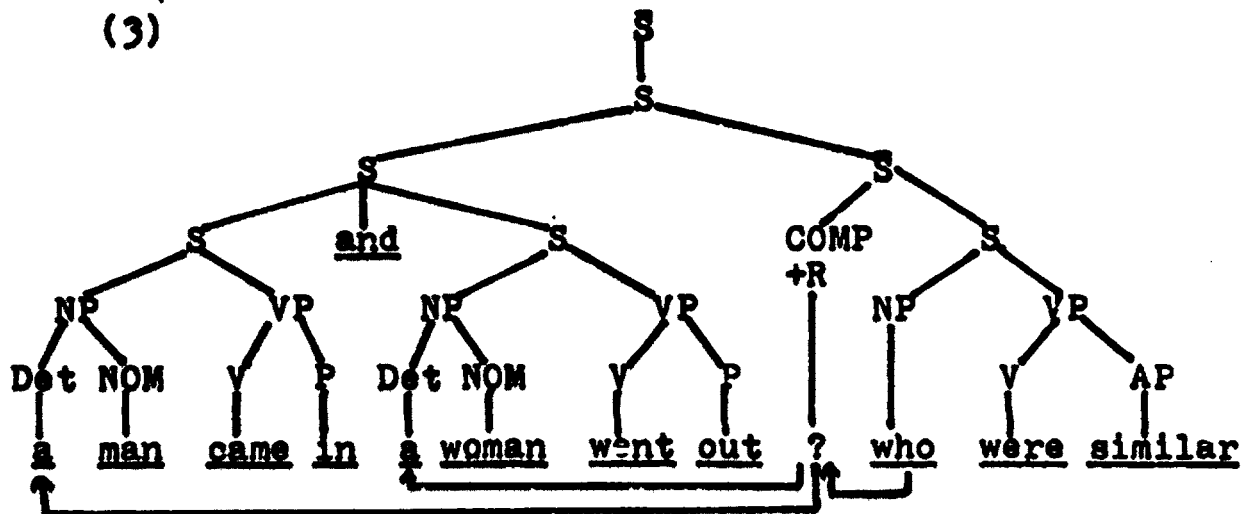
I shall call a relative complementizer. 'R' guides semantic interpretation in a language universally determined fashion so as to result in relative clauses being interpreted the way they are, and is also involved in language particular grammar in various ways. For example, many languages have special morphemes that introduce (or follow) relative clauses. These may be regarded as elements that are lexically inserted for relative complementizers.

I shall extend Bresnan's theory by claiming that there are two extra-constituent structure relations in which relative complementizers participate. First there is the trigger-target relation, which holds between the COMP of a relative clause and its relative constituent. Second there is the head-trigger relation that holds between the COMP of a relative clause and its head constituent. In cases where these constituents have determiners, it seems best to relate the COMP with the determiners rather than with the containing constituents. The reasons for this will be seen in chapter 2.

Assuming English relative clauses to be introduced by an $NP \rightarrow NP \bar{S}$ rule, we then get the following representation for the boy who Zack gave a joint to:



The extra-constituent structure relations are crucially used in explaining the properties of examples in which the relative clause cannot be associated with the head by a simple constituent structure relation. Such an example is Ross and Perlmutter's (1970) a man came in and a woman went out who were similar:



Observe that the nature of the predicate in the relative clause makes it impossible to derive this example by extraposing the relative clause within each conjunct and then applying Right Node Raising.

The reasons for formulating the system along the lines given here instead of in other ways that one might imagine will be primarily developed in chapter 2. Observe for the present, however, that Baker's (1968, 1969) work on questions (attacked by (Kuno and Robinson 1972) and re-supported by (Hankamer 1974)) shows that there are connections between complementizers and 'target' constituents within their clauses in cases where there is nothing like a head constituent, and that the properties of result clauses associated with (sometimes multiple) occurrences of so in examples like Bill drank so much beer in so little time that he threw up (see (Lieberman 1974)) show that there are connections between clauses and head constituents that are separated from them in cases where there is no constituent in the clause other than the complementizer that can be connected to the head. Our treatment thus minimizes the variety of extra-constituent structure relations utilized.

I shall conduct the study under various limitations of scope. First, I shall for the most part be restricted to describing the more obvious formal properties of relative clauses: what morphemes mark them, whether anything moves or deletes, where it goes, etc.. Subtler topics, such as accessibility (see (Keenan 1972), (Keenan and Comrie 1972)), will sometimes be treated, but only sporadically.

Second, I shall not attempt to consistently draw fine distinctions between types of relative clauses. It is obvious that the category 'relative clause' in English alone covers a wide range of different constructions, and in universal grammar the range can only be wider. There are for example restrictive relatives, ordinary nonrestrictives on NP, nonrestrictives in both which and as on constituents other than NP (Max squealed, for which he'll die; Mary is pregnant, as you know), whatever-clausal NP (I'll take whatever items I find to my superiors) and pseudo-relative comparatives (he's not the linguist he used to be). These types are surely only a beginning. I believe that a thorough investigation of the variety of types of relative clauses in English alone would yield many more species than I discern in this study for language as a whole.

Amongst all these types, the restrictive relative clause on a definite head, which has the semantic effect of forming a definite description from a clause, seems to be the core relative clause. Almost all languages (Jakobson reports Gilyak as an exception) have some equivalent to this construction, while the representation of the other types is more sparse. Portuguese, for example, lacks nonrestrictives that modify S (personal communication of Carlos Quicoli), while Navajo lacks nonrestrictives entirely. Japanese

and Turkish on the other hand make no syntactic distinction between restrictive and nonrestrictive, using the same structure indifferently for both. It is interesting to observe that speakers of these languages seem to have difficulty in seeing the difference between the two usages. Inasmuch as the restrictive clause on a definite head NP seems to be the most prominent and universally represented variety of relative clause, I shall concentrate on it and mention other types less consistently.

Finally, I shall restrict my attention to relatives that are clauses in surface structure. I shall ignore reduced relatives.

The varieties of relative clause construction submit to classification under a unified scheme. On the other hand languages seem to select their particular inventory of relative constructions in accordance with no obvious principle. I will therefore organize the typology around the kinds of construction rather than around some classification of the languages.

I will introduce a language at the first point in the discussion where it has something especially significant to offer, at that time giving the necessary background information to render the examples comprehensible. I will then return to any given language as often as necessary in the sequel. In an

appendix to this chapter I provide an index of languages that specifies where in the chapter I give substantial discussion of a language, and what my sources of information on it are.

In section 1.1. I discuss the constituent structure relations obtaining between relative clauses and their heads, in section 1.2. I investigate the fate of the relative constituent, and in section 1.3. I review some phenomena that suggest that some relative clauses have their heads extracted from within them.

1.1. Constituent Structure Relations: Relative clauses may on the surface appear dominated by an NP within their matrix S, or they may appear at the beginning or the end of the matrix, separated from their head by a stretch of material that is in the general case unbounded. The former kind I call embedded relatives, the latter, adjoined. Embedded relatives may appear with a head or without one. If they have a head, they may precede or follow it. We thus have three varieties of embedded relative clause. There are then two types of adjoined relative: anticipatory relatives that precede their matrix and trailing relatives that follow. I shall also suggest that there are extraposed relatives in addition to trailing relatives.

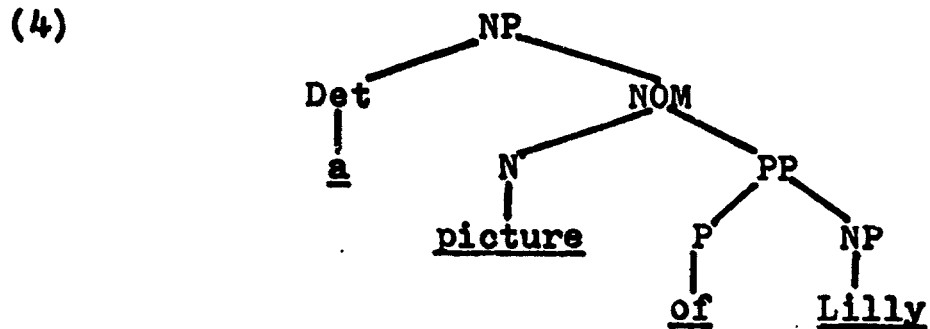
These five surface structure types seem to divide naturally into three major families: the headed embedded relatives, comprising pre- and post-

relatives, the headless relatives and the adjoined relatives. We will find that the types within each family, which differ from each other only in relations of linear order, are closely related. Nevertheless it will also become apparent that each position has some peculiarities of its own. Hence the existence of transformational relations between paired linear order types is possible, but not entirely unproblematic. We will however find arguments that the three major families are not transformationally derived one from another, but rather that the deep structures for each family are of roughly the same form as the surface structures.

In section 1.1.1. I will discuss headed embedded relatives, in section 1.1.2. I will discuss headless relatives, and in 1.1.3. I will discuss adjoined relatives. Finally in 1.1.4. I will make some general remarks.

1.1.1. Embedded Relatives with Heads These are the most familiar, although perhaps not the most common, types of relative clauses. All of the types studied in (Bach 1965), for example, are in this family. Since embedded relatives with heads have been studied for so long, there are a great many proposals in circulation as to what their underlying structures and derivations are. The majority of these are conveniently summarized and evaluated in (Stockwell, Schachter and Partee 1973).

If we take (4) as representing the constituent structure of the English NP



then the most conservative alternatives for the structure of the restrictive relative in English are given by letting it be introduced by the rules $\text{Det} \rightarrow \text{Art } \bar{S}$, $\text{NOM} \rightarrow \text{NOM } \bar{S}$, $\text{N} \rightarrow \text{N } \bar{S}$ or $\text{NP} \rightarrow \text{NP } \bar{S}$. Of these my personal favorite is $\text{NP} \rightarrow \text{NP } \bar{S}$, and I will assume this rule and its mirror-image $\text{NP} \rightarrow \bar{S} \text{ NP}$ when I give structures for pre- and post- relative clauses.

(Brame 1968) proposes another analysis in which the head of the relative clause is extracted from within it as a copy of the relative constituent, of which a pronominal copy may be left behind in the form of a relative pronoun. This analysis is proposed in order to explain the grammaticality of such examples as the headway (that) we made pleased our advisor. headway is a noun which is characteristically restricted to being an underlying object of make. Brame's analysis explains the grammaticality of the above example by providing it with an underlying structure in which this condition is met.

(Vergnaud 1974) works out for French a version of Brame's analysis in considerable detail. He gives (pp. 81-84) an argument which shows that if there is an extraction of the head from the clause, then the extracted constituent must be an NP, and that if there is not such an extraction, then the $NP \rightarrow NP \bar{S}$ analysis must be chosen over the three alternatives given above.

The argument may be easily adapted to English. Consider examples such as the following:

- (5) a. the man and the woman who were related
got married
- b. an electron and a positron that collided
produced a shower of gamma rays
- c. any boy and any girl who love each other
will buy this device.

These examples share with Ross and Perlmutter's extraposed relative (example 3) the property that the nature of the predicate prevents the relative clause from reaching its surface position by being generated in each conjunct and then being fused and attached to the entire coordinate structure by Right Node Raising. It is immediate that if one extracts, one must extract NP rather than a sub-constituent of NP; and that the $NP \rightarrow NP \bar{S}$ analysis can generate the constituent structure of these examples while the $Det \rightarrow Art \bar{S}$, $NOM \rightarrow NOM \bar{S}$ and $N \rightarrow N \bar{S}$ cannot.

Although I will not adopt the extraction analysis in the following pages, in section 1.3. I will discuss a variety of phenomena which could probably be made to support it.

Although I adopt the $NP \rightarrow NP \bar{S}$ analysis for post-relative restrictives and its mirror image for pre-relatives, we shall in the following pages find some difficulties with these rules. One such problem is provided by examples like the motion that we made to expel Harry or the proof that I gave in class that Pi is irrational (pointed out to me by Mark Baltin). If one believes that complement clauses are introduced by a $NOM \rightarrow N \bar{S}$ rule, then these examples suggest that at least some relative clauses are introduced by an $N \rightarrow N \bar{S}$ rule. We shall find other such problems below.

One matter deserving discussion is the constituent structure of nonrestrictive relatives in English. Unlike restrictive clauses, nonrestrictives cannot stack:

- (6) a. the man who was laughing who you pointed out
to me was arrested
- b. *Bill, who was laughing, who you pointed out
to me, was arrested.

We also observe that a nonrestrictive can be attached to an NP modified by a restrictive:

- (7) the man who was laughing, who you pointed out to me,
was arrested.

For a restrictive to modify an NP + nonrestrictive combination is, of course, impossible.

Martin (1972) in an extensive study of the restrictive-nonrestrictive distinction in English proposes that there should be as little structural differentiation between the types as possible, with the major burden of explanation for the distinctions to be carried by the differing logical form of the types. But we shall see that in Japanese semantically nonrestrictive clauses seem to be indistinguishable from restrictives, even having the power to stack. This suggests that the special features of nonrestrictives in English should receive an explanation in terms of syntactic structure.

A traditional proposal for the derivation of nonrestrictive relatives is to get them from underlying coordinate structures: a rule called Swooping would produce (8b) from (8a), then nonrestrictive clause formation would yield (8c) from (8b):

- (8) a. Clarence is a swinger and he is wearing
mauve socks
- b. Clarence, and he is a swinger, is wearing
mauve socks
- c. Clarence, who is a swinger, is wearing
mauve socks.

(Ross 1967: section 6.2.4.2) notes a severe counter-example to this derivation:

- (9) is even Clarence, who is a swinger, wearing
mauve socks?

Of course we can also embed nonrestrictives in imperatives, and (Martin 1972) notes that imperatives

can serve as nonrestrictives within declaratives. Likewise even interrogatives have a marginal capacity to be nonrestrictive relatives. These points are illustrated in the following:

- (10) a. get Bill, who is in charge of this operation
- b. I have included a CV, which find enclosed
- c. I want to talk to that man, who who the hell is he, anyway?
- d. thoughts, which how found they harbour in thy breast, Adam, misthought of her to thee so dear? (Paradise Lost IX 288-289)

Since imperative and interrogative clauses cannot be conjoined with declaratives, the coordinate structure source for nonrestrictive relatives is in deep trouble.

It is interesting to note that 'Swooped' coordinate structures seem to really be Swooped by the criterion that establishes that nonrestrictive relatives are not:

- (11) a. *is Clarence, and he is a swinger, wearing mauve socks?
- b. *buy Clarence, and he is a swinger, a new gas furnace.

This observation reinforces Ross' counterargument to the Swooping derivation for nonrestrictive relatives.

Ross unenthusiastically proposes to analyse nonrestrictives by resurrecting the concept of 'generalized transformation,' having nonrestrictives derived by a transformation that combines two main clauses. Hence (9) would be derived from (12)

- (12) Clarence is a swinger. Is even Clarence wearing white socks?

(I have reversed the order of clauses from Ross' in order to make the discourse sound better).

But even this proposal, which Lakoff (1974) has recently advocated generalizing into a theory of 'syntactic amalgams' falls in the face of the following example:

- (13) everybody got a pen, with which he wrote a letter.

The clause here has the superficial appearance of a nonrestrictive, and seems to the intuition to be nonrestrictive in force. Nevertheless it manages to be within the scope of the universal quantifier in its matrix, as is betrayed by the fact that he is bound by that quantifier. Such binding is of course impossible between conjuncts or between main clauses in a discourse:

- (14) a. *everybody got a pen (,) and he wrote a letter with it
 b. *everybody got a pen. he wrote a letter with it.

The subordinate clause of (13) also has deeper properties of nonrestrictives. For example, Martin (1972) notes that the relative pronoun of a nonrestrictive, but not of a restrictive, can be the object of of in a partitive quantificational construction:

- (15) a. the boys, some of whom were rich kids, were arrested
 b. *the_i boys some of whom were rich kids were arrested.

Now observe (16):

- (16) everybody got three pens, with one of which he wrote a letter.

Ross' proposal likewise seems doomed.

Chomsky has proposed (class lectures, Spring 1973) to introduce nonrestrictive relatives by a 'three-dimensional' rule $NP \cdots \bar{S}$. This notation means that the relative clause is in the sentence structure and somehow related to the NP it modifies, but does not bear linear order or dominance relations to it. Late linearization rules are then supposed to put the clause in the position where we see it on the surface. This proposal could probably be made to avoid the difficulties we have posted against the others, but it possesses the theoretical demerit of requiring an unworked out and ad-hoc modification in our conception of what a sentence structure is. A proposal within the bounds of ordinary notions of constituent structure would be preferable.

Work by Siegel (1974) suggests an answer. Siegel proposes that NP in English (and in languages generally) are introduced by a rule $CP \rightarrow NP \text{ CASE}$ (or, of course, is mirror image). She identifies CP as \bar{N} and NP as \bar{N} , but this is irrelevant here. We may explain the facts that nonrestrictives do not stack and that they follow restrictives by introducing them as sisters of NP under CP. The following show that nonrestrictives cannot

follow the genitive case-marker:

- (17) a. *Bill's, who is a swinger, house is too cold
 b. *I gave a picture of Bill's, who is a swinger,
 to Maurice.

I therefore propose to introduce nonrestrictive relatives by revising Siegel's rule to $CP \rightarrow NP (\bar{S})$ CASE.

We may also observe that nonrestrictives do not sound very good before the genitive case-marker:

- (18) a.?*Bill, who is a swinger, 's house is too cold
 b.?*I gave a picture of Bill, who is a swinger, 's
 to Maurice.

This may be explained by the observation that the genitive case-marker 's is an element which must be a phonological word with the material immediately preceding it. The pause that follows nonrestrictives makes this impossible.

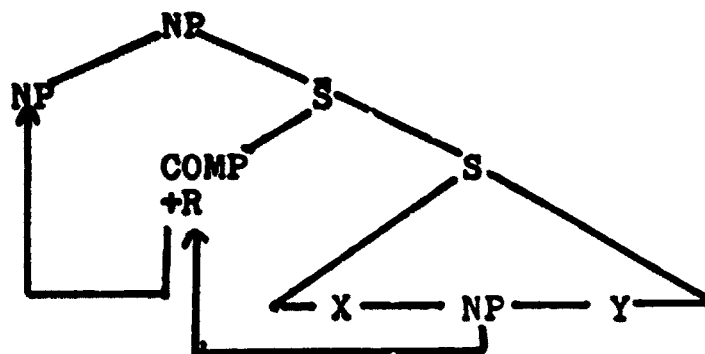
I shall return to the subject of nonrestrictive relatives and Swooping in chapter 2. For the present, I shall end by calling attention to two of the most obvious questions of universal grammar that are raised by my proposal. First, is the association of $NP \rightarrow NP \bar{S}$ with restrictive and $CP \rightarrow NP (\bar{S})$ CASE with nonrestrictive relativization an accident of English? Second, what linear order variants does the $CP \rightarrow NP (\bar{S})$ CASE rule have? I do not have answers to these questions, though I will venture a speculation in section 1.1.1.4.

Now, at last, on to the long-awaited languages!

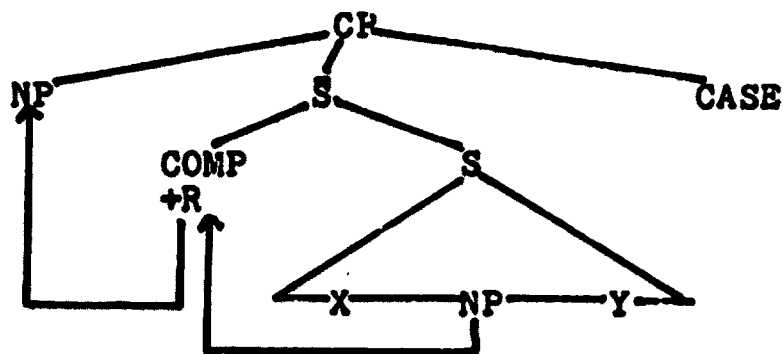
In section 1.1.1.1. I will look at post-relative clauses, in 1.1.1.2. I will look at pre-relatives and in 1.1.1.3. I will examine a number of languages in which the two constructions cooccur. The main result to emerge will be that these relative clauses are the same as adjectives in their external constituent structure relations. Finally in 1.1.1.4. I will summarize the results and speculate on some tendencies associated with linear order of head and relative clause.

1.1.1.1. Post-Relatives: I have proposed two underlying structures for post-relative clauses in English, (19) for restrictives and (20) for nonrestrictives:

(19)



(20)



Some languages with a post-relative clause construction that are genetically unrelated are the following:

(21) Languages having Post-relative Clauses:

| | |
|-----------|------------|
| English | Samoan |
| Hungarian | Maasai |
| Hebrew | Micmac |
| Georgian | Eskimo |
| Swahili | Shan |
| Nuer | Vietnamese |
| Crow | Dyirbal |
| Papago | Dagbani |
| Hottentot | |

It requires subtle work to choose between (19) and (20), or to argue for them against alternatives. I shall not therefore so decide for the languages I examine. We will find the evidence consistent with either of the alternatives.

I shall look first at Samoan, then at Faroese, and finally at Eskimo.

1.1.1.1.1. Samoan:² Samoan is a VSO language. Naturally then, most modifiers of NP follow the head: adjectives, non-pronominal possessive phrases, prepositional phrases and relative clauses. S_{rel} may have NP_{rel} present in surface structure as a pronoun, or, in subject or object position, the pronoun may be deleted by regular processes of anaphoric pronoun deletion.

Here we see adjectives and possessives following the head N:

- (22) a. 'o le teine puta
 Prt. the girl fat
 "the fat girl"
- b. 'o va'a lapopo'a
 Prt. boats big
 "big boats"

- c. 'o le paopao o Tavita
the canoe of David
"the canoe of David"
- d. 'o le naifi a le taule'ale'a
the knife of the young man
"the knife of the young man"

The particle 'o precedes NP in a variety of environments which I do not understand. One of them is when the NP is being cited. The choice between a and o is made on semantic grounds which are quite obscure, even to students of Polynesian.

These examples show relative clauses that follow the head:

- (23) a. 'ua nofo mai i le mālō le tupu fou
PERF come to the throne the king new
na te le'i iloa 'Iosefa
he PAST not know Joseph
"There came to the throne a new king who did not know Joseph."
- b. 'o i ai tangata toa 'ua āva
there are men valiant PERF do honor
'iate 'ilātou lea tupulanga ma lea tupulanga
to them generation after generation
"There are valiant men to whom generation after generation do honor."
- c. 'o le mea lenei 'ua 'ou 'aumaia
Prt. the thing this PERF I bring
'iate 'oe
to you
"This is the thing which I bring to you."
(Note that extraposition applies here)
- d. 'ua fa'apea le tangata 'ua
PERF is the same with the man PERF
fai mā'sani leanga
does habits bad
"It is the same with the man who indulges in bad habits."

In all of these examples NP_{rel} vanishes from the surface form of the relative clause. (24) shows that this can be effected by a rule applying to ordinary anaphoric pronouns:

- (24) a. 'ua 'ou 'aumaia 'iate 'oe
 PERF I bring to you
 "I have brought it to you."
 b. 'ua fai māsani leanga
 PERF does habits bad
 "he indulges in bad habits."

In (25) I give relative clauses in which the relative constituent is a pronominal adverb, and in (26) I give the corresponding main clauses. The pronominal adverbs are ai and a'i, which always migrate to behind the verb:

- (25) a. 'o tupe 'ua lātou fa'atau a'i
 Prt. money PERF they buy with it
 le fanua
 the field
 "the money with which they bought the field"
 b. 'o le fale 'u tupu ai Mose
 Prt. the house PAST grow up in it Moses
 "the house which Moses grew up in"
 (26) a. 'ua lātou fa'atau a'i le fanua
 PERF they buy with it the field
 "They bought the field with it."
 b. 'ua tupu ai
 PAST grew up in it

Grinder has observed that Samoan is quite lax in its observance of Island Constraints. Perlmutter (1972) has proposed to explain this on the basis that there is in Samoan no special rule deleting NP_{rel}. Rather, the effacement, when accomplished at all, is accomplished by Pronoun-Drop rules that apply generally to anaphoric

pronouns. Pronoun Drop would involve no variables and hence would not set off Island Constraints.

We may also observe that relative clauses occupy roughly the same position as adjectives, except that they may appear extraposed (23c).

1.1.1.1.2. Faroese: Faroese is a close relative of Icelandic spoken in the Faroe Islands. Its conventional orthography, which I use here, maximizes the resemblance to Icelandic and minimizes the relation to the surface phonetic form.

Faroese relative clauses are introduced by \emptyset , the particle sum, or sometimes by ið, and NP_{rel} is deleted. Like Icelandic, Faroese often suffixes the definite article of an NP to the head. When a Faroese NP with the suffixed definite article has either a relative clause or an adjective, the demonstrative pronoun tann 'that' is usually put before the NP as well. Hence we find the following:

- (27) a. tann svartí kettlingur-inn
that black kitten-the
"the black kitten"
- b. tað góða korn-ið
that good corn-the
"the good corn"
- c. tey hægstu fjøll-ini
those highest mountains-the
"the highest mountains"

- (28) a. tann maður-inn, sum gjórdi hettar
that man-the that did this
"the man who did this"

- b. tað er tað ljótasta djór, eg
 that is that most loathsome animal I
 nakrantið havi soð
 ever have seen
 "That is the most loathsome animal that
 I ever have seen."
- c. ~~ta~~r konur-nar heima skuldu vera, eru
 those women-the at home should be are
 burtursaddar
 away
 "The women who should be at home are away."

Note that in (28b) the suffixed article is omitted. I do not know when this can happen.

These examples show the relative clause acting like an adjective in a more subtle way than merely being in approximately the same place: in fact the adjective and the relative clause are in different places in the surface structure. We shall in 1.1.1.4. adduce a consideration that suggests that if there is a transformational relationship then the position of the relative clause after the head is the basic one, with adjectives being transformationally preposed.

1.1.1.1.3. Eskimo:³ In Eskimo the relative clause again has much the same external constituent structure as does the adjective, and can in addition be seen to occupy a position between CASE and the head N.

To render the examples more intelligible, I will present a thumbnail sketch of Eskimo morphology and syntax. Eskimo verbs and nouns are built up from a base morph by adding first derivational suffixes and

then inflectional endings. The derivational suffixes are many, and the derivational processes are astonishingly productive, and recursive. Suffixes have the semantic effect of modifying adjectives or adverbs, of higher verbs or nouns, or of many other things.

For example, given a form X we may add the suffix liur 'to construct,' to get a verb stem meaning 'to construct an X.' To this may be added another suffix vig to get a noun-stem X-liur-vig 'a place in which to construct an X' After some more suffixes have been added, perhaps, we may add liur again in order to get a verb meaning 'to construct a place in which to construct an X.'

Nouns are inflected for number and case, and have in addition an agreement suffix showing the person and number of the possessor, if there is one. The numbers are singular, dual and plural. The cases divide naturally into 'syntactic' and 'adverbial.' The syntactic cases are the relative and the absolutive. The relative case is used on possessors of NP and on subjects of transitive verbs. It is thus a genitive-ergative (a great deal of Eskimo scholarship has been devoted to trying to make this dual function of the relative follow from something). It is marked with a suffix that is underlyingly a labial, appearing on the surface mostly as p or m. The absolutive case is used on the subjects of intransitive verbs and the objects of transitives, and is not marked by any formative, consisting of the stem alone. The adverbial

cases are Instrumental, Locative, Allative, etc., and appear to be marked by suffixes that are attached to the relative case-form of the noun.

The basic order of elements in the NP is (Possessor) Head ({ Adjective Relative Clause }). Adjectives are morphologically indistinguishable from nouns. It is not clear that they are even a separate class of stems. They agree with the head in number and case. Adjectives must be distinguished from a class of adjectival suffixes that may be added to any nominal stem.

Verbs have a mood suffix followed by subject and object agreement suffixes. Furthermore stems (which are structures of the form Base + one or more Derivational Suffixes) are almost always inherently transitive or intransitive, with inherently transitive stems being understood as reflexive when they appear with intransitive inflection. The moods are various, including an indicative which is used in declarative main clauses, which has the mood suffix -va when transitive and -vu when intransitive, an interrogative for questions, ... transitive and intransitive participial moods, which appear to be nominalization forms of verbs, and various others.

The syntax of relative clauses with transitive verbs is exceedingly complex and difficult to discern, owing to the paucity of examples and multiplicity of structures that they seem to exhibit. But relative

clauses with intrnasitive verbs are comparatively straightforward. They are formed by putting the main verb of S_{rel} into the intransitive participial mood and deleting NP_{rel} .

The intransitive participial appears to be the form which nominalized intransitive verbs normally take.

Hence we have (29):

- (29) paasi-ssa-v-r-put ... kalaaliy-u-š^vu-gut
 realize-FUT-TR.IND-it-we Greenlander-be-INT.PRT-we
 "We shall realize that we are Greenlanders."
 (Bergsland 29.4, pg. 46)

(All examples are from (Bergsland 1955), and transcription used is his). TR.IND is the hieratic symbol for the transitive indicative mood marker, and INT.PRT is that for the intransitive participial. Here kalaaliu^vugut 'we being Greenlanders' is the object of paasissavarput 'we shall realize it.' \underline{r} in the main verb is the agreement suffix referencing the nominalized S.

In relative clauses, if NP_{rel} is the subject of S_{rel} , then it is deleted and the intransitive participial acts pretty much like an ordinary adjective. An example of this is (30):

- (30) iglu-ni tammar-tu-q uyar-i-ni
 cousin_i-his_i be lost-INT.PRT-he_j seek-TR.PRT-him_j-he_i
 his_i cousin_j who_j was lost he_i seeking him_j
 unnir-lu-gu
 say-CONT-him_j
 saying of him_j

"Saying that he_i was looking for his_i cousin_j who_j was lost (Bergsland 29.5.2, pg. 46)

CONT is the symbol for one of the subordinate verbal

moods used mostly when the time of the subordinate clause is roughly the same as that of the matrix clause, and the subjects of both are identical. If the CONT verb is transitive, as it is here, then its own subject is deleted and leaves no agreement marker on the verb.

ni in igluni 'his cousin' and uyarini 'he seeking him' is the agreement suffix of the so-called fourth person. This is really a kind of reflexive pronoun, used when the antecedent asymmetrically commands (with respect to both S and NP nodes) the pronoun, and the antecedent is a subject. This reflexivization process is not clause-bounded. The pronoun is virtually always deleted by normal anaphoric processes, leaving the fourth person suffix as a remnant. In uyarini the TR.PRT ending is phonologically reduced and the object agreement suffix is destroyed.

More interesting are some examples in which NP_{rel} is the possessor of the subject of S_{rel} . The verbal character of the intransitive participial verb of S_{rel} is shown by its taking a subject in the absolutive case, regardless of the case of NP_{hd} . Bergsland claims that the participial agrees in number with its subject and in case with the NP_{hd} . Unfortunately in the examples he gives the head and the subject of S_{rel} are identical in number.

- (31) a. natsir-niq miqquw-i
 seal skin-PL.INSTR hair-PL their
 with seal skins their hairs
 qummu-kar-tu-nik
 upwards-go-INT.PRT-PL.INSTR
 they going upwards
 "with seal skins whose hairs go upwards"
 (Bergsland 29.3, pg. 45)
- b. ukiyuliguni nanu-ršū-up
 bear-big-REL(case)
 when winter comes big bear
 kiina-a miqqu-qa-ṇṇitsur-šū-up
 face-its hair-have-not-INTR.PRT-it REL(case)
 its face it having no hair (the face)
 tikiraa-qqip-pa-si
 come(visiting)-again-IRREAL-it you
 it comes visiting you again
 "When winter comes, when the big polar
 bear whose face has no hair again comes
 to you."
 (Bergsland 29.7.2. pg. 49)

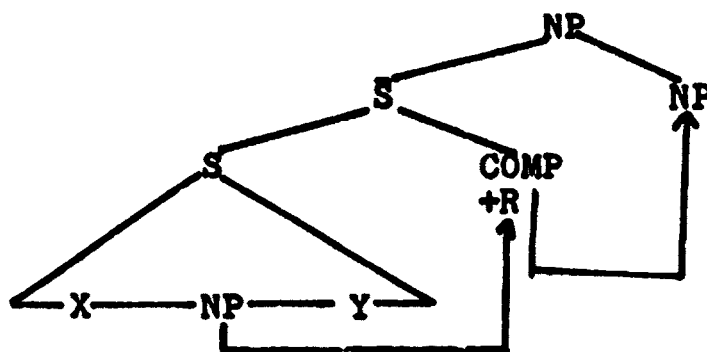
IRREAL is the symbol for the Irrealis mood, used in various subordinate clauses referring to things that haven't happened yet. In each example there is a subject of S_{rel} , and this subject is absolutive in case. The verb of S_{rel} , which is an intransitive participial, sports the case ending of NP_{hd} , just as an adjective would. In these examples as well as in the previous ones NP_{rel} disappears. It is clear that in the above examples it is not NP_{hd} which is disappearing, because if NP_{rel} were to survive it would be absolutive in case. This disappearance can be taken as a consequence of the Eskimo Pronoun Drop rule: there is no need to postulate a special rule for the purpose of deleting NP_{rel} .

There are two arguments afforded by Eskimo concerning the constituent structure of relative clauses. First, since the verb of S_{rel} is nominalized, S_{rel} must be dominated by NP, and, second, since it agrees with NP_{hd} in case, it is in the same NP as NP_{hd} and is furthermore roughly the same kind of modifier that an adjective is. This paralellism is reinforced by the fact that relative clauses and adjectives are similar in following the head N whereas possessors precede it. We may finally observe that if the adjectives and relative clauses precede CASE in underlying structure, the rule case-marking the elements of the NP (or CP) will be a rule copying case to the left, rather than a rule spreading it in both directions. One might take the NP NP \bar{S} analysis as being slightly favored, because the rule could then be taken as copying the CASE onto all the major constituents of the NP that follow the head N (excluding, of course, possessives). These considerations are, of course, highly tenuous.

The construction I have discussed is one of the many relative clause or relative clause-like constructions in Eskimo. (Woodberry, in preparation) contains a much richer range of constructions discussed in considerably greater detail.

1.1.1.2. Pre-Relatives: I propose pre-relatives to have underlying structures of the form given in (32):

(32)



I have found no reason to propose a pre-relative counterpart to (20), the structure produced by the $CP \rightarrow NP(\bar{S})$ CASE: rule. But I do not believe that my research has been sufficient to settle the point.

Below I list some genetically unrelated languages having a pre-relative construction:

(33) Languages with Pre-relative Clauses:

| | |
|-----------|-------------------|
| Japanese | Korean |
| Hottentot | Mongolian |
| Turkish | Telugu |
| Ainu | Basque |
| Navajo | Chinese |
| Papago | Classical Tibetan |

As representatives of these languages I will discuss Japanese and Turkish.

Before discussing these languages, however, I wish to venture a brief remark on the structure (32). The reader will observe that I have placed the COMP its S rather than before. This is because I am aware of no pre-relative clause constructions with introductory particles. Another fact, however, renders the analysis of clause-final relative clause markers (such as we shall see in Turkish, section 1.1.1.2.1.)

slightly problematical in individual languages. (Kuno 1974) has observed that pre-relatives are characteristic of SOV languages and post-relatives of SVO and VSO languages. Therefore the COMP at the end of a relative clause may either be a COMP or something inside the S: an AUX or an affix on the verb. I believe that both situations arise.

1.1.1.2.2. Japanese:⁴ The general form of relativization in Japanese is familiar to linguistics. See, for example, the general discussions in (Kuno 1973) and (McCawley 1972), and the references cited in these works. In this discussion I intend to make an assortment of points connected with theoretical issues in this paper: the constituent structure of relative clauses, the restrictive/nonrestrictive distinction, and the general treatment of NP_{rel}.

Japanese is an SOV language with postpositions, conjunctions that follow their sentences, and modifiers, including relative clauses, that precede what they modify. Grammatical relations are marked by particles that follow the NP.

There is a thematic construction in which an NP is placed initial to the S and followed by the particle wa, which sometimes follows, sometimes replaces the particle appropriate to the grammatical relation of the theme to the sentence. This construction bears an intimate relation to the grammar of relativization, which is discussed in the above-mentioned work and will also be treated in section 1.3.1. of the present paper.

Case-marking and Thematization are discussed in considerable detail in (Kuno 1973), so I see no need of discussing them here.

A relative clause precedes its head, and in the usual construction NP_{rel} vanishes, taking along its postnominal particles. These points I illustrate in (34-35). (34) is a clause that I embed in (35a) by relativizing on the object and in (35b) by relativizing on the subject:

(34) ano hito ga hon o kai-ta
 that person SUBJ book OBJ write-PAST
 "That person wrote a book."

(35) a. kore wa ano hito ga kai-ta
 this THEME that person SUBJ write-PAST
 hon desu
 book is
 "This is a/the book which that person has
 written."

b. kore wa hon o kai-ta hito desu
 this THEME book OBJ write-PAST person is
 "this is a/the person who has written a book"

The subject of a relative clause (or other subordinate clause immediately dominated by NP) may be marked with no, the possessive or genitive marker, instead of ga. Hence (35a) may be rendered kore wa ano hito no kaita hon desu.

The first question I will address is the possibility of replicating in a pre-relative structure the argument of Vergnaud (1974) (discussed above in section 1.1.1.) that English and French have a [_{NP} NP S] surface structure for relative clauses.

While Japanese lacks definite or indefinite articles, it does have the demonstrative pronouns and adjectives kono 'this,' sono 'that (by you),' and ano 'that (yonder).' If we assume Japanese to introduce the demonstratives under the Det produced by an NP→Det NOM rule, then the following example serves to yield a counterpart to Vergnaud's argument:

- (36) otagaini ai site iru ano otoko to ano
 each other love doing be that man and that
 onna ga kekon si-ta
 woman SUBJ marriage do-PAST
 "The man and the woman who loved each other
 got married."

Unfortunately the claim that relative clauses are introduced by NP→S NP and demonstratives by NP→Det NOM cannot be accepted without further scrutiny. Relative clauses are perhaps best when they precede the demonstrative, but may also come between a demonstrative and its head. These possibilities are shown in (37):

- (37) a. boku ga sonkeisite iru kono hito ga
 I SUBJ respecting be this person SUBJ
 Tokyo ni sunde iru
 Tokyo in living is
 b. kono, boku ga sonkeisite iru hito ga Tokyo ni
 sunde iru
 "That person who I respect lives in Tokyo."

These two possibilities are not in free variation, but I will not discuss the factors that condition them.

One way to accomodate (36-37) would be to claim that the demonstratives were introduced by a rule NP→Dem NP parallel to the rule introducing relatives. This would

require finding some further mechanism to block ano kono hito, kono kono hito, etc.

I leave the resolution of the questions raised by this discussion to scholars of Japanese. It suffices to point out that a clarification of the constituent structure relations of demonstrative adjectives in Japanese would shed light on the constituent structure relations of relative clauses.

It has often been observed that Japanese does not mark a distinction between restrictive and nonrestrictive relatives. Kuno (1973 pg. 235) cites the following pairings of restrictive and nonrestrictive clauses in order to show the formal indistinctness of the two types:

- (38) a. watakusi in eigo o osiete iru Mary
I to English OBJ teaching be Mary
"Mary, who is teaching me English" (nonrestrictive)
- b. watakusi ga sitte iru Mary
I SUBJ knowing be Mary
"the Mary that I know" (restrictive)
- (39) a. honyuu-doobutu de aru kuzira
mammal is whale
"the whale, which is a mammal" (nonrestrictive)
- b. nihon-kai ni sunde iru kuzira
Japan-sea in living be whale
"the whales that live in the Japan sea"
(nonrestrictive)

Similary, Japanese report considerable difficulty in distinguishing between the two types of clauses, which suggests more strongly that there is no syntactic differentiation between the two types in Japanese.

To confirm these impressions, we find that Japanese nonrestrictive clauses can stack, just as restrictives can:

- (40) kinoo Mary ga at-ta, ringo ga
 yesterday Mary SUBJ meet-PAST apples SUBJ
 suki na John
 liking being John

"* John, who Mary met yesterday, who likes apples"

These clauses in (40) cannot be conjoined because Japanese does not conjoin clauses by juxtaposition, but requires special final particles on the initial clause.

The fact that Japanese has nonrestrictives that are essentially indistinguishable from restrictives provides the major motivation for providing the two clause types with different syntactic structures in English, inasmuch as this is the most straightforward way to connect the syntactic differences to the semantic.

The final topic I wish to discuss is the treatment of NP_{rel}. Kuno (1973) shows that Japanese is quite lax in its obedience to island constraints, as is Samoan. Likewise Japanese has a very general rule deleting pronouns, even first and second person pronouns. There hence no need to postulate for Japanese any special processes deleting NP_{rel}: a pronominal NP_{rel} will delete of its own accord by the general rule. To strengthen the plausibility of this explanation we may observe that Japanese needn't in general delete NP_{rel}; it may attain the surface

as a pronoun, a demonstrative, or even as a full NP.

Kuno (1973 pg. 237) cites the following examples:

- (41) watakusi ga (so kare sono hito)
 I SUBJ (that / he / that person)
 no namae o wasurete-simat-ta okyaku-san
 POSS name OBJ forget-PAST guest
 "the guest whose name I have forgotten"

I shall later develop the notion that the presence of such structures with overt NP_{rel} is related to laxity of island constraints in languages with very general pronoun deletion processes.

I here end my discussion of Japanese.

1.1.1.2.2. Turkish: Turkish has both pre- and post-relatives. The post-relatives were borrowed from Persian, and are said to be frowned upon and to be disappearing from the language. The pre-relatives are the native construction. Here I shall consider only the pre-relatives, deferring the post-relatives for 1.1.1.3.1.

Turkish is an SOV language with considerable scrambling of major constituents in main clauses. In the noun phrase then, modifiers typically precede the head, with the exception of the post-relative clause borrowed from Persian. Turkish has postpositions and case-markers that follow the head, marking nominative, accusative, genitive, locative, dative and ablative cases. Verbs and nouns have agreement suffixes referring to their subjects and possessors, respectively.

The suffixes manifest person and number. Subject and possessor pronouns are freely deletable. There is considerable syntactic paralellism between the subject of an S and the possessor of an NP, since when an S is nominalized its subject becomes genitive, and possessor-agreement suffixes are attached to the nominalized verb. The subject and possessor agreement suffixes are morphologically similar and were originally identical.

The relative clauses (both pre- and post-) are closely related to nominalizations corresponding to the English that clauses used as the objects of verbs meaning 'think,' 'say,' etc. The post-relative clause is related to a nominal clause that was borrowed from the Persian along with the relative. The pre-relative is related to a native nominalization.

I shall first describe the native nominalization. This is formed with the aid of the 'personal participle' endings. These endings come in two forms: acak/ecek (varying by vowel harmony) for the future, and dig/dig/ dug/düg (again varying by vowel harmony) for the non-future (present and past). These endings replace endings marking a past-nonpast distinction in 'finite' clauses, and do not have the possibilities for aspectual elaboration that verbs in finite clauses have. To the personal participle endings are attached possessor agreement suffixes which show the person and

number of the subject, which appears in the genitive case. If the nominalized sentence is being used as a direct object, an accusative case marker appears after the agreement suffix, in accordance with the normal rule.

Hence we have examples such as the following:

- (42) a. Halil Orhan-ın İstanbul-a git-tiğ-i-ni
 Halil Orhan-GEN İstanbul-DAT go-NOM-his-ACC
 düşün-üyor
 think-PROG
 "Halil thinks that Orhan went (or is going) to İstanbul"
- b. Hasan, Fatma-nın o-nu öl-dür-eceğ-i-ni
 Hasan Fatma-GEN he-ACC die-cause-FUT-his-ACC
 düşün-üyor
 think-PROG
 "Hasan thinks that Fatma will kill him."

A likely explanation for the properties of these nominalizations is that they lack an S node to dominate them in the later stages of the derivation, due to some sort of pruning, or that their S nodes are heavily infused with nominal features. The resulting structure would then be roughly like (43):



Since the subject NP bears the same structural relation to the dominating NP as would a possessor NP, it gets the genitive case. Since the NP and the VP are related in the same way as are a possessor and a possessed NOM, possessor agreement suffixes get copied onto the latter.

I assume the VP to be a VP because it has the full range of internal structure of a VP; the full set of complements, adverbs, etc. (Siegel 1974) gives a not tremendously dissimilar analysis of the gerund in English. It is worth pointing out one fact, however, which is that there is a general dearth of evidence for a VP node in Turkish. (Hankamer 1971) cites the absence of any pronominal VP comparable to the English do so, and various other sorts of missing possible evidence as well.

There are two kinds of nonfinite relative clauses: one where NP_{rel} is within the subject, either as the subject itself or as its possessor, or even as the possessor of the possessor, etc.; and the other when NP_{rel} is outside the subject (that is, in the VP). This latter construction has the same internal syntax and morphology as do the nominalizations described above, except that NP_{rel} is always deleted. Below are examples:

- (44) a. Halil-in (*o-nu) öldür-düğ-ü adam
 Halil-GEN (him-ACC) kill-NOM-his man
 "the man whom Halil killed"
- b. gel-dik-leri vapur
 come-NOM-their steamer
 "the steamer on which they came"
- c. baba-sı-nın ev-i-ni al-dığ-ımız
 father-his-GEN house-his-ACC buy-NOM-our
 adam
 man
 "the man whose father's house we bought"

- d. iç-in-den çık-tı ğımız ev
 interior-its-ABL emerge-NOM-our house
 "the house from which we emerged"

That there is a deletion rule is demonstrated by (40a-b) where a pronoun for NP_{rel} results in unacceptability (contrast with (42b)). In (44c-d) it could be that NP_{rel} was being deleted by the rule that deletes unemphatic subject and possessor pronouns. Object pronouns, however, do not freely delete, so this account does not extend to (44a-b).

The other nonfinite construction is used when NP_{rel} is within the subject. For this form a participle ending en/an is used for nonfuture tense, and the future tense and a past tense for events not known through personal observation may be expressed with the periphrastic forms ecek (olan) and miş (olan) respectively. olan in these forms is the en-participial form of the verb ol 'to be, become.' The subject of S_{rel} is nominative, and there are no agreement suffixes on the verb. Some examples are:

- (45) a. dün gel-miş ol-an mektup
 yesterday come-PAST be-PRT letter
 "the letter which came yesterday"
- b. baba-sı şimdi konuş-an man
 father-his now speak-PRT man
 "the man whose father is now speaking"
- c. oğl-u-nun kedi-si et-i yiy-en adam
 son-his-GEN cat-his meat-ACC eat-PRT man
 "the man whose son's cat ate the meat"

The en/an formative might be introduced by a transformation or a base-rule. If a transformation then (46) shows that the rule is cyclic or post-cyclic:

- (46) dün Hasan-ın tarafından öldür-ül-en
 yesterday Hasan-GEN by kill-PASS-PRT
 çocuk
 child

"the child who was killed by Hasan yesterday"

On the reasonable assumption that in Turkish passive sentences the surface subject is derived by promotion of an underlying object, (46) shows that the marking of the participle must follow Passive, since it is not until Passive has applied that NP_{rel} is within the subject. (46) also shows that if the en/an participle is to be introduced by a base-rule, there will have to be some sort of interpretive principle constraining its distribution that applies during or after the cycle.

We may further note that the en/an participle has the effect of preventing the subject from taking the genitive case. Given a transformational account of en-attachmant, we could accomodate this by having en-attachment precede and bleed the nominalization rule. There would need to be an additional process to delete NP_{rel}. As in Eskimo, the nominalization of the verb evidences that S_{rel} is dominated by an NP node.

I shall now turn to some languages in which pre-

and post- relative clauses coexist.

1.1.1.3. Languages with both Pre- and Post- Relatives:

Some languages with both types of headed embedded relative clauses are listed below:

- (47) Classical Tibetan
Hottentot
Quechua
Papago
Turkish

I shall discuss Turkish, Classical Tibetan and Hottentot.

1.1.1.3.1. Turkish: The other Turkish construction consists merely of a clause identical in internal syntax to a main clause which is introduced by a particle ki (derived from the Persian ke). Clauses introduced by ki are also used as subjects and objects of verbs, as are the ke-clauses of Persian. In both the Turkish and Persian relative clauses with ki/ke, the clause is a post-relative and NP_{rel} is deleted. Persian relativization will be discussed later in this chapter.

Below are some examples of ki-clauses in Turkish:

- (48) a. düşünüyorum ki Hasan gelecek
I think that Hasan will come
"I think that Hasan will come."
- b. şüphesiz ki gelecek
doubt-without that he will come
"It is without doubt that he will come"
- c. bir çocuk ki kapıyı kapamaz
a child that the door does not close

We note that once again we have a relative clause with the same form as a nominalization. In this case

of course, it is fundamentally a fact about Persian rather than about Turkish.

Inasmuch as the two relative clause constructions of Turkish are quite distinct in their internal syntactic structure, I believe that it would be reasonable to derive them by two distinct base-rules, one generating the pre-relatives and the other the post-relatives.

1.1.1.3.2. Classical Tibetan: This obscure language has basically SOV word-order. It uses a wide variety of post-positions, and modifiers of nouns can occur on either side of the head. When modifiers precede the head, they are followed by a particle whose underlying phonological shape is kyi. Furthermore the verbs of relative clauses are nonfinite and take a suffix pa, which is of extremely common use in Tibetan, forming an agent-nominalization, among other things. Whether pa is a relativization marker or just a general nominalizer I do not know. In a relative clause, NP_{rel} is somehow deleted.

- (49) a. bla-ma'i gos
 lama:GEN vestments
 "lama's vestments" ('i is a reduced form of kyi, and, following the conventional usage, I shall label it the genitive. The hyphens in Tibetan transcriptions separate syllables, not formatives.)
- b. skam-pa'i sa
 dry:GEN earth
 "dry earth"

- c. $\dot{c}hu$ ni bsil-ba-yis
water cold with
"with cold water"
- d. sahs-rgyas-kyi $\dot{c}h\ddot{o}s$ thams-cad yañ-dag-par
Buddha-GEN law all completely
thob-pa'i blo
obtain-REL:GEN intelligence
"intelligence which completely attains
the entire law of the Buddha"
- e. [_{NP} ne-togs dañ 'bras-bu'i çin-l]on-pa [_{S_{rel}}
flowers and fruits:GEN trees
sq-chogs dus tha-dad-par dbyuh-ba]]
diverse times different:LOC bear fruit:REL

(49d) is a relative clause that precedes the head, and (49e) is one that follows, and we thus find in (49e) no kyi following the verb. Note in (49e) the NP dus tha-dad-par 'at different times', which has the syntactic pattern HEAD-ADJ-CASE.

These examples show that adjectives and relative clauses share some of the same syntax in Tibetan. There is still a question as to what is responsible for the two possible orders: either two base orders, as in Turkish, or one base order and a process of permutation. It is also worth noting that kyi could not be easily analysed as a Complementizer, since it appears on adjectives.

1.1.1.3.3. Hottentot: In addition to being entertaining in its own right, the evidence from Hottentot provides further argument that embedded relative clauses are constituents with their head, and that they are a category related to adjectives and other nominal

modifiers. I shall discuss the Nama dialect.

The basic Hottentot sentence structure is Subject-Verb Phrase. I have not yet untangled the syntax of the verb phrase with its rules for the placement of verb, objects and tense and aspect particles. These rules are quite complex. There is a curious rule which extraposes the subject into the VP and provides it with an accusative case-marker if it is non-initial due to there being an introductory particle or topicalized NP at the front of the S. Furthermore a clitic copy of the subject is left behind attached to the initial element which triggered movement of the subject. This rule will be seen in action in the relative clause examples.

Hottentot nouns take endings for grammatical gender (masculine, feminine, neuter/common) and number (singular, dual, plural), which are identical with the clitic forms of third person pronouns (the nonclitic forms consist of a stem //ei to which appropriate gender endings (i.e. clitic forms) are added). Modifiers, adjectives, possessives, demonstratives and relative clauses may either precede or follow the head. If they follow, the gender-number endings are copied onto them, if they precede, they are not. There is also an accusative case-marker a which is attached to the last member of the NP. The language is postpositional, forming possessive phrases with a post-

position di. These points of Hottentot grammar are illustrated in the following examples:

- (50) a. $\text{gei} / \text{g\ddot{o}a-n}$
big child-N(EUT).PL
"big children"
- b. $//\text{g\ddot{u}-b}$ $\text{di} / \text{on-s}$
father-M(ASC).SG GEN name-F(EM).SG
'the father's name'
- c. ao-gu gei-gu
man-M.PL big-M.PL
"the big men"
- d. $//\text{go\ddot{a}-b}$ $/\text{a-s}$ di-b
wall-M.SG city-F.SG GEN-M.SG
'the wall of the city'
- e. $\text{m\ddot{u}}$ ta go ao-b gei-b-a
see I(clitic) PAST man-M.SG big-M.SG-ACC
"I saw the big men"

Like other modifiers, relative clauses may precede or follow the head, and when they follow, the agreement marker of the head shows up on the last word of the clause, which in all the examples I have found is a verb. When the clause follows the head it is introduced by a particle h\ddot{ia}/ia (I can find no basis for the variation), and when it precedes there is no introductory particle. NP_{rel} is deleted. Note especially that when NP_{rel} is the underlying subject of S_{rel} there is no clitic form left behind.

- (51) a. nari ta gye $\text{m\ddot{u}}$ kho-b $\text{gye} //\text{gei te}$
today I PERF see man-M.SG. PERF call me
'The man who I saw today calle' me.'

- b. khoi-b, ia go //ari ha-b
 man-M.SG REL PAST yesterday come-M.SG.
 gye mi
 PERF say

"the man who came yesterday said ..."

- c. /gōa-b hīa-s tara-s-a gye
 boy-M.SG. REL-F.SG woman-F.SG.-ACC PERF
 si-b gye go //hawu
 send-M.SG PAST get lost

"The boy whom the woman sent got lost."
 (gye in the main clause of this example is
 a sort of emphatic particle, not a tense/
 aspect marker)

- d. tara-s , hīa-ts gye sats-a //gei
 woman-F.SG REL-you PERF you-ACC call
 ha-s go neti ha
 be-F.SG PAST now come
 (aux. verb)

"the woman whom you called has now come"

Note the subject extraposition, which has applied in (c-d). Unfortunately, available examples all involve relative clauses modifying the subjects of sentences, so it is impossible to exhibit the accusative case-marker tacked onto a relative clause following the head. But the workings of the agreement rule can be clearly seen. Note that the form attached to the relative clause is determined by what the head is, and not by what the subject of the clause, is, or any other such thing. These facts show that the Hottentot relative clause is a constituent of an NP containing its head, and has roughly the same external syntax as an adjective.

I shall now turn to some general discussion of the effects of order in the pre- and post- relative clause

constructions.

1.1.1.4. Differences between Pre- and Post- Relatives:

I will here comment on two respects in which the grammar of relative clauses appears to be asymmetrical with respect to linear order. Both observations are quite tentative, and their proffered explanations correspondingly speculative.

First, I believe that pre-relative clauses are more prone than post-relatives to having their subjects put in the genitive case. A functional explanation for this fact is not difficult to think of. In order to avoid center-embedding of S, pre-relative clauses lack COMP or similar introductory particles. The function of a genitive marker on the subject of the relative clause may then be to signal the beginning of a complex constituent: the genitive may serve as a cue that the NP bearing it is not a major constituent of the clause being processed but an initial subconstituent of a major constituent.

Second, we observed that Japanese lacks any formal distinction of restrictive and nonrestrictive clauses. Such a distinction is also lacking in the other pre-relative clause structures I have examined: Korean, Basque and Turkish.

In Korean⁵ we can stack nonrestrictive relatives. (52) is a Korean parallel to the Japanese example (40):

- (52) [_{NP}[_S tehak-e tani-nin][_{NP}[_S ne-ka chowa-ho-nin]
college-to go-REL I-NOM like-do-REL
[_{NP} Mary]]]
Mary

"*Mary, who goes to college, who I like"

nin is a particle that follows relative clauses. This structure is distinct from one in which the two relative clauses are coordinated. I illustrate such a structure as (53):

- (53) [_{NP}[_S[_S tehak-e tani] ko [_S ne-ka chowa-ho]] nin]
college-to go and I-NOM like-do REL
[_{NP} Mary]]

"Mary, who goes to college and who I like"

The fact that nin can be attached to a coordination of S suggests that it is a bona fide occupant of a clause final COMP.

Although I know of no language that marks the restrictive/nonrestrictive distinction in pre-relative position, it is not the case that in all languages pre-relatives can be interpreted nonrestrictively. According to (Perkins 1974) Navajo pre-relatives can only be interpreted restrictively, and my own inquiries have confirmed this finding.

We may prevent restrictive and nonrestrictive pre-relatives from having distinct constituent structures by requiring in universal grammar that when CP expands to CASE, NP and \bar{S} , the \bar{S} follow the NP. There are other aspects to the distinction in English, such as the requirement that nonrestrictives have a relative pronoun. Their status

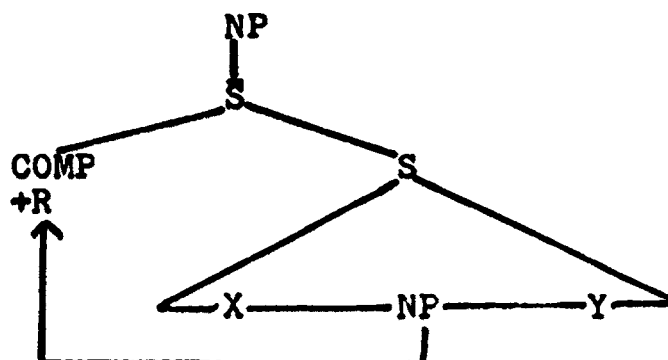
is unclear.

With these speculations I end my discussion of pre- and post- relative clauses.

1.1.2. Headless Relative Clauses: There are many languages in which there are relative clauses which lack a head in surface structure. Instead the relative clause appears dominated by NP, with NP_{rel} being either a pronoun or a full NP, and perhaps bearing a special mark (such as wh in English).

I propose the following structure (or its mirror-image) for such relative clauses:

(54)



Most languages appear to have headless relative clauses in which NP_{rel} is a pronoun. These are generally called free relative clauses, and have been discussed in English by (Baker 1968) and (Kuroda 1969). Bill ate what was lying on the table is a typical free relative clause in English. Less widespread are those constructions where NP_{rel} is a full NP. To distinguish these from free relatives I shall follow (Gorbet 1974) in calling them internal head relatives. Such a relative clause in English is what beer we drank was flat. In English the internal head relative clause is a very

minor construction, but in other languages, such as Diegueño and Navajo, it is the major vehicle of relativization.

Internal head relative clauses may coexist in a language with either pre- or post- relative clauses, and in some languages, such as Diegueño, may be the only kind of relative clause other than free relatives. In this language internal head relative clauses coexist with a variety of structures whose analysis is dubious.

Below I give a list of languages having internal head relative clauses, indicating whether they coexist with pre- or post- relative clauses:

(55) Languages with Internal Head Relative Clauses:

| | | | |
|---------|---------|----------|--------------------|
| Hopi | (pre-) | Crow | (pre-) |
| Navajo | (post-) | Diegueño | (pre- and post- ?) |
| Dagbani | (pre-) | English | (pre-) |

In this section I will discuss Navajo and English. Later in the chapter I will consider Dagbani and Crow. Diegueño receives a major treatment in (Gorbet 1974), and Hopi is discussed in (Jeanne 1974).

1.1.2.1. Navajo: Navajo is an SOV language with postpositions and conjunctions that follow the subordinate clauses they are associated with.

I shall identify four relative clause constructions in Navajo: a free relative, indistinguishable in form from a kind of indirect question, a pre-relative, an internal head relative, and an extraposed relative. My information on these constructions is drawn from (Platero 1974), (Kaufman 1974) and (Perkins 1974).

The latter types appear to be related to each other as against the free relatives. Therefore after some more general discussion of Navajo grammar, I will first discuss the pre-, internal head and extraposed relatives, and then turn to the free relatives. My discussion on many points will be incomplete, as a much fuller treatment is given in (Platero 1974) and (Kaufman 1974).

Navajo has agreement processes whereby verbs are marked for the person and number of their subjects and objects. Postpositions are also marked for these features of their objects, and possessed NP for these features of their possessors. In the examples here we shall see only marking of verbs. The agreement markers are prefixes, and are placed in the order Object-prefix Subject-Prefix, and are interspersed with a great variety of other prefixes of diverse functions. We shall encounter a future tense, and perfective and imperfective aspects (IMP and PERF). Phonological rules of great complexity obscure the underlying form and arrangement of the prefixes, rendering futile any attempt to gloss formatives in the surface phonological form. The rules are discussed in (Stanley 1969).

We thus have the simple transitive and intransitive sentences (56):

- (56) a. ashkii alháá'
 boy IMP:3:snore
 "the boy is snoring"

- b. ashkii at'ééd yiztal
 boy girl 3:PERF:3:see
 "the boy kicked the girl"

There is an interesting rule of Subject-object inversion which interchanges the positions of subject and object, and replaces yi, the 3rd person object prefix for transitive verbs, with bi. Applying this rule to (56b) we get (57):

- (57) at'ééd ashkii biztal
 girl boy 3:PERF:kick
 "the girl was kicked by the boy"

All relative clauses end in a formative í(gíí) or its alternate éé (sometimes áá due to phonology), which is a complementizer used in various sorts of nominal subordinate clauses other than relative clauses. These complementizers are given considerable general treatment in (Kaufman 1974). NP_{rel} in a relative clause can be subject, object, possessor or the object of a postposition. I will illustrate the first two possibilities. The others may be found in (Platero 1974).

(53) is an intransitive clause. In (59 a, b, c) I embed it as a pre-, internal head and extraposed relative, respectively:

- (58) tl'eedáá' ashkii ałháá'
 last:night boy IMP:3:snore
 "the boy was snoring last night"

- (59) a. *tl'eedāā' alháā'-āā ashkii yádool̥tih*
 last:night IMP:3:snore-REL boy FUT:3:speak
- b. *tl'eedāā' ashkii alháā'-āā yádool̥tih*
 last:night boy IMP:3:snore-REL FUT:3:speak
- c. *ashkii yádool̥tih tl'eedāā' alháā'-āā*
 boy FUT:3:speak last:night 3:PAST:snore-REL

"the boy who was snoring last night will speak"

The clause internal position of ashkii in (59b) shows that it is NP_{rel} rather than NP_{hd}.

(60) is a transitive clause with first person subject, and in (61) I embed it in the three constructions just as in (59):

- (60) *lééchaa'í sētal̥*
 dog 3:PERF:1:kick
 "I kicked the dog"

- (61) a. *sētal̥-ēē lééchaa'í nahal̥'in*
 3:PERF:1:kick-REL dog IMP:3:bark
- b. *lééchaa'í sētal̥-ēē nahal̥'in*
 dog 3:PERF:1:kick-REL IMP:3:bark
- c. *lééchaa'í nahal̥'in sētal̥-ēē*
 dog IMP:3:bark 3:PERF:1:kick-REL

"the dog that I kicked is barking"

A question that arises immediately, especially in the light of some of the constructions we will be considering in section 1.1.3., is how we know that the purported internal head relative clauses of (59b) and (61c) are actually dominated by NP, taking the place of ordinary nouns in the syntactic structure of their matrices. We can see this by observing examples in which there are internal head relative clauses both in object and in

subject position, and in which the subject-object inversion rule applies:

- (62) a. $\text{ada}^{\text{a}}\text{ada}^{\text{a}}$ shi-zhē'ē li^{i} nayiisnii'-ēē
 yesterday my-father horse 3:PERF;3:buy-REL
 ashkii $\text{lē}^{\text{e}}\text{chaa}'\text{i}$ bishxash-ēē yizta ɬ
 boy dog 3:PERF;3:buy-REL 3:PERF;3:kick
 "the horse which my father bought yesterday
 kicked the dog which bit the boy" or
 "the horse which my father bought yesterday
 .. kicked the boy whom the dog bit"
- b. ashkii $\text{lē}^{\text{e}}\text{chaa}'\text{i}$ bishxash-ēē $\text{ada}^{\text{a}}\text{ada}^{\text{a}}$
 boy dog 3:PERF;3:bite-REL yesterday
 shi-zhē'ē li^{i} nayiisnii'-ēē bizta ɬ
 my-father horse 3:PERF;3:buy-REL 3:PERF;3:kick
 (same as (62a) in meaning)

We see that the internal head construction is subject to considerable ambiguity: ashkii $\text{lē}^{\text{e}}\text{chaa}'\text{i}$ bishxashēē in (62) can be interpreted either as "the boy who the dog bit" or "the dog that bit the boy" (note the application of Subject-object inversion in the relative clause).

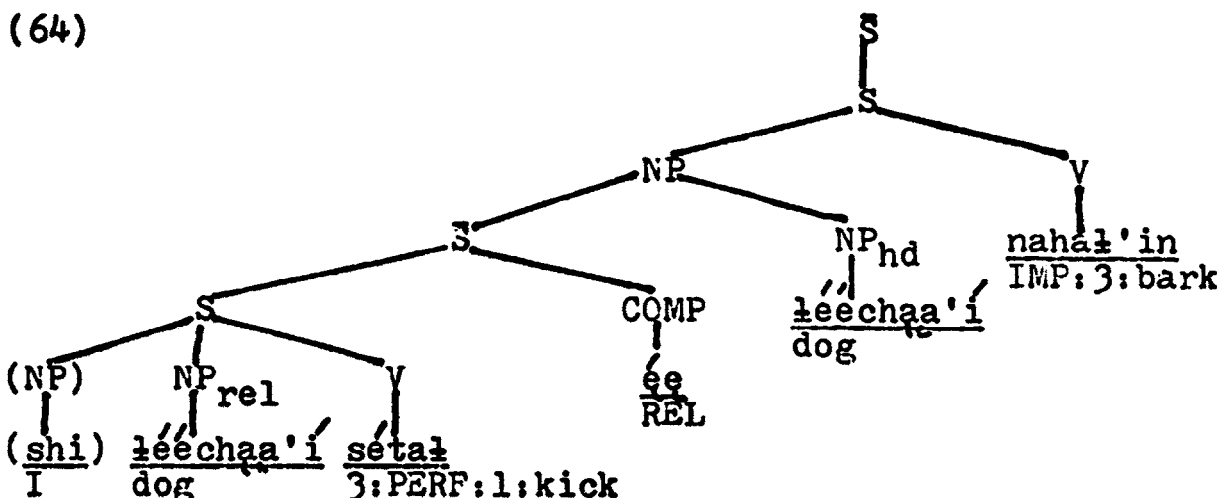
We would expect the pre-relative construction to likewise be ambiguous. But in that structure there are principles discussed by Platero that eliminate ambiguity in most cases. (63a) thus gets the reading (63b) but not (63c):

- (63) a. ashkii $\text{yiyiilt}^{\text{a}}\text{sa}-(\text{n})\text{ēē}$ at'ēēd yaltih
 boy 3:PERF;see-REL girl IMP;3:speak
- b. the girl who saw the boy is speaking
- c. *the girl who the boy saw is speaking

Platero proposes to derive the three structures we have been considering from a common source: a prrelative

structure in which NP_{rel} and NP_{hd} are represented by full NP. The extraposed relatives are derived by a rule of extraposition. Evidence against this discovered by Perkins (1974) will be discussed in section 1.1.3.6.. Here I shall discuss and criticize the proposed derivation of pre- and internal head relatives.

By Platero's proposal the common source for the examples of (61) will be (64):



We can apply deletion forwards, deleting NP_{hd} and deriving (61b), or we can apply deletion backwards, deleting NP_{rel} to derive (61a). There are thus no internal head relative clauses in underlying structure.

Platero hypothesizes that the deletion rule applying in relative clauses is the same as ordinary pronominalization, which in Navajo may be effected by deletion. Pronominalization by deletion may go forwards, or backwards into a subordinate clause. These points are illustrated in example (65), in which there is an initial subordinate clause in the adverbial complementizer go:

- (65) a. ashkii yah-'ííyá-(a)go neezdá
 boy into-PERF:3:go-COMP PERF:3:sit
 b. yah-'ííyá-(a)go ashkii neezdá
 into-PERF:3:go-COMP boy PERF:3:sit

"when the boy_i came in, he_i sat down"

Between coordinated clauses we can delete forwards, but not backwards:

- (66) a. ashkii yah-'ííyá dóó neezdá
 boy into-PERF:3:go and PERF:3:sit
 "the boy entered and sat down"
 b. yah-'ííyá dóó ashkii neezdá
 into-PERF:3:go and boy PERF:3:sit
 "he_i entered and the boy_j sat down"

This restriction manifests itself in the relative clause system as the fact that in the extraposed construction NP_{hd} cannot be deleted:

- (67) *nahal'in léé'chaa'í sétat-éé
 IMP:3:bark dog 3:PERF:1:kick
 "the dog that I kicked was barking"

Platero observes a significant defect of this solution, which is that while the deletion effected by ordinary pronominalization is optional, in the relative clause construction either NP_{rel} or NP_{hd} must go. Hence we have (68) as an alternative to (65), and (69) as an alternative to (66):

- (68) ashkii yah-'ííyá-(a)go ashkii neezdá
 boy into-PERF:3:go-COMP boy PERF:3:sit
 "when the boy_i came in, the boy_i sat down"

- (69) ashkii yah-'íyá-(a)go doó ashkii neezdá
 boy into-PERF:3;go-COMP and boy PERF:3:sit
 "the boy₁ entered and the boy₁ sat down"

But (70), the sentence derived from (64) by applying no transformations, is ungrammatical:

- (70) *lééchaa'í sétat-ée lééchaa'í nahalín
 dog 3:PERF:1:kick-REL dog IMP:3:bark
 "the dog I kicked is barking"

In the article, Platero suggested that perhaps deletion of NP_{rel} was optional in extraposed relative clauses, but he stated that this was not true for all speakers, and has since then decided (personal communication) that deletion of NP_{rel} is obligatory in these structures.

(Platero and Hale 1974) propose a reanalysis in which an internal head structure is underlying for the relative clause, and the head is extracted optionally. A further alternative would be to say that there are underlyingly both pre- and internal head relative structures, and that deletion of NP_{rel} is obligatory in the pre-relative. On either of these analyses the obligatory disappearance of NP_{rel} in the pre-relative construction is easily accounted for.

These analyses are also rendered more attractive by the fact that, as we shall shortly see, internal head relative clauses may coexist with post-relatives as well as pre-relatives. A rule deleting the head of a post-relative clause on identity to NP_{rel} would violate the normal conditions on deletion. Other arguments against

head-deletion will be adduced.

I finally observe that the relative clause constructions in Navajo cannot be used nonrestrictively. Hence the following are all ungrammatical:

- (71) a. *Kii sétaɬ-éé neezdá
 Kii 3:PERF:1:kick-REL PERF:3:sit
 "Kii, who I kicked, sat down"
- b. *sétaɬ-éé Kii neezdá
 3:PERF:1:kick-REL Kii PERF:3:sit
 "Kii, who I kicked, sat down"
- c. *Kii neezdá sétaɬ-éé
 Kii PERF:3:sit 3:PERF:1:kick-REL
 "Kii sat down, who I kicked"

One might be tempted to associate the absence of a nonrestrictive interpretation with the hypothesis that underlying internal head structures cannot be interpreted nonrestrictively; this would entail accepting a head-extraction analyses for the pre-relative structures. This suggestion is obviously highly speculative.

I shall now briefly consider the free relative clauses. I shall consider them only in connection with another construction, the enclitic phrase. The enclitics are a class of particles that are suffixed to NP and PP in order to express various notions of direction and other concepts associated with motion and location. With the enclitic di 'at,' we can thus form (72):

- (72) hastiin kin-di sídá
 man house-at IMP:3:sit
 "the man is sitting at the house"

Platero (1974) notes two presumably related peculiarities of enclitics: their object NP cannot take demonstratives, and their object NP cannot be relativized:

- (73) a. *shí díí tsékooh-di sédá
 I this canyon-at IMP:1:sit
 "I am sitting in this canyon"
- b. *hastiin kin-di sidá-(h)ígíí naa'íízhoozh
 man house-in IMP:3:sit-REL PERF:3:collapse
 "the house the man was sitting in collapsed"

With free relatives, however, we find the situation quite different.

(Kaufman 1974) observes a construction that appears to be used both as an indirect question and as a free relative clause. The target NP of the construction can be an enclitic phrase with no full NP head, and the enclitic migrates to the í(gíí)/éé COMP that terminates both constructions.

(74) illustrates the construction used as an indirect question:

- (74) díí bilagáanaa diné bizaad yíhool'áá'áa-di
 this whiteman Navajo language 3:PERF:3:learn:COMP-at
 doo shíí béé'hozin-da
 NEG 1:with 3:know-NEG
 "I don't know where this Anglo learned Navajo."

The use as a free relative is illustrated by (75):

- (75) galbáhí a'aán-góne' yah-eelwou-í-gíí hatl'ée'
 rabbit hole-in into-PERF:3:run-REL-at area is dark
 "It is dark in the area around where the rabbit
 ran into the hole"
 *"It's dark in the hole which the rabbit ran into"

The second, incorrect, translation is what the sentence would mean if it were a relative clause on a'aangóne 'in the hole.' Instead it appears to be a free relative on a deleted enclitic phrase with the enclitic gi 'at,' the free relative giving the location around where the rabbit ran into the hole.

Any number of things might be happening with these constructions. They might be superficially homophonous but underlyingly distinct constructions, as are the free relatives and indirect questions of English. On the other hand they might all syntactically be free relatives, with the 'indirect question' of (74) a kind of 'concealed question' (see Baker 1968). What seems certain, however, is that free relatives have some significantly different properties from the others.

Here I conclude my discussion of Navajo.

1.1.2.2. English: We observed above that in addition to free relatives and ever-clauses, English has an internal head relative clause exemplified in such examples as what beer we found was flat. I shall first distinguish this latter construction, which for reasons that will become apparent I will call the paucal relative, from the others, and then I will provide an argument that in paucal and in free relatives the wh-marked NP is a constituent of the relative clause rather than a head. I will finally briefly consider a reason to suspect that the wh-marked NP may be generated in initial position

rather than preposed.

The paucal relative looks like a free relative with a full head nominal supplied. Perhaps the first thing we notice is that we can only supply such a nominal when the NP is plural or mass:

- (76) a. I drank what was provided
- b. I drank what beer was provided
- c. *I drank what glass of milk was provided
- (77) a. Fred hid what was on the table
- b. Fred hid what weapons were on the table
- c. *Fred hid what weapon was on the table.

This requirement that the NP be non-individual (see Fiengo 1974) distinguishes the paucal relative not only from the free relative but also from the whatever-clause, inasmuch as we can say Fred hid whatever weapon was on the table.

We may next observe that while we can add the paucal quantifiers few and little to NP_{rel} in the paucal construction, these are the only quantifiers that may be added:

- (78) a. Fred hid what few weapons were on the table
- b. Bill drank what little wine we had
- c. *I saw what three people arrived early
- d. *I know what many people came to the party.

With the whatever construction, numerals, but not paucal quantifiers are possible:

- (79) a. *I greeted whatever few people came to the door
 b. I hid the coats of whatever three people he brought

(79b) is not terribly good, and for many other quantifiers the judgements are too shady for me to wish to make any claims about them.

We may finally observe that the paucal relative clause makes the imputation that the referent of the clause is present in meagre, insufficient amounts. Hence (76b) implies that not much beer was provided, and (77b) that not many weapons were on the table. Nonetheless this imputation seems to be weaker than it would be were a paucal quantifier present, as may be seen by examining (78 a, b), and examples can be found where the imputation of paucity is very weak or perhaps nonexistent: we will take what steps are necessary.

Nonetheless as a preliminary explanation I shall propose that there is an underlying element PAUC in the quantifier phrase position of the paucal relatives without overt surface quantifier. PAUC is an abstract member of the class otherwise comprising few and little, and it is weaker in force. By supposing that it shares with few and little the requirement that the quantified NP be non-individual we may explain the impossibility of count singular heads in the paucal construction, as well as the interpretation of the clauses.

While the postulation of abstract elements in syntax is dangerous, it is worth pointing out that the quantifiers are a closed rather than an open class, so that their members may be distinguished from each other by a finite set of features that may be properly said to be a part of the grammar of the language. We can thus treat PAUC as the archi-quantifier embracing few and little. The effect of our analysis is to connect the requirement that the relative NP be non-individual with the restrictions on the quantifiers possible for this NP.

We now turn to the problem of proving that the wh-NP in the free and paucal relative constructions are really constituents of the relative clause. I shall first offer and dispose of a potential argument that does not go through, and then establish the point by a consideration of the behaviour of returning pronouns.

We may observe that the free and paucal relatives do not permit the wh NP to be followed by the particle that:

- (80) a. *I drank what (little) beer that was on the table
- b. *I drank what (little) beer that we found
- c. *I ate what that he brought.

It strikes me that the that is much better with the paucals (80a, b) than with the free relative (80c). I have no explanation for this.

This argument fails to fully convince because \emptyset , that and relative pronouns are not in free variation as initials

for relative clauses in English. Consider the following series of examples:

- (81) a. I met a girl I liked
 b. I met a girl that I liked
 c. I met a girl who I liked.

(81a) has the sense that I met one of the girls who I liked, while (81c) means most preferably that I met a girl and liked her. (81b) appears to be ambiguous. (I am indebted to William Centrall for some discussion of these and related subtleties of meaning). The 'contact' relative construction, the one with neither that nor relative pronouns, thus appears to be distinct from the other two, as they are from each other. We could therefore claim that the free and paucal relatives consisted of a wh marked NP as head together with a contact relative.

We now consider the argument from the behaviour of returning pronouns. Returning pronouns are pronouns occupying the pre-wh movement or relative pronoun deletion position of NP_{rel}. They are fully grammatical in certain geographical regions, such as Texas, and many other speakers, such as myself, are highly tolerant of them. In the following examples we see returning pronouns:

- (82) a. The people who Bill says that they stole
 his car are standing over there
 b. He is a criminal that the FBI will be pleased
 if they catch him.

(Carlson and Martin 1974) note a restriction that resumptive pronouns must be fairly deeply embedded in the relative

clause in order to be acceptable, and that they sound best if they are in a position from which island constraints and other such restrictions would prevent one from moving or deleting a pronoun. Hence the girl who I saw her is ungrammatical.

I will here note two further restrictions on returning pronouns. First observe that they can occur neither with questions nor with free relatives:

- (83) a. the ice-cream that Fred says if you eat it you'll get off has been withdrawn from the market
- b. the automobile that the policeman who impounded it got a citation was a Buick
- (84) a. *what does Fred think (that) if you eat it you'll get off?
- b. *what (automobile) did the policeman who impounded it get a citation?
- (85) a. *what Fred says (that) if you eat it you'll get off has been withdrawn from the market
- b. *what the policeman who impounded it got a citation is being held at the courthouse
- (86) a. *what few drugs Fred says (that) if you take them you'll get off have been withdrawn from the market
- b. *what few weapons the policemen who impounded them got citations are being held at the courthouse.

We may next observe that even in a headed relative clause returning pronouns cannot co-refer with a constituent preposed by pied piping:

- (87) a. *There is the boy whose mother Bill says that she's a stripper
- b. *this is the car the owner of which the patrolman who arrested him got a citation.

We can see from (83-87) the generalization that a returning pronoun is ungrammatical without a head with which it can corefer without anomaly. In (84-86) there is no head at all, and in (87) the returning pronoun cannot be coreferential with the head without destroying the semantic interpretation of the clause. It is clear that if the wh-NP of (85-86) were analysed NP_{hd} rather than as NP_{rel} we could not achieve this unification of restrictions on returning pronouns.

I shall finally observe a reason for suspecting that the NP_{rel} in the headless relative constructions are generated in COMP position. It was observed by Joan Bresnan (in as yet unpublished work) that pied piping is impossible with free relatives. It is also impossible with paucal relatives:

(88) a. I stole what Bill was writing with

b. *I stole with what Bill was writing

(89) a. Bill alienated what few girls he danced with

b. *Bill alienated with what few girls he danced.

We might semantically analyse a relative clause as consisting of a sentence open on a variable \underline{x} to which an operator R binding \underline{x} is prefixed. We might further suppose that the operator is restricted by whatever nominal material is in NP_{rel} . Hence who Bill saw would translate as $(R \underline{x}:\text{human})(\text{Bill saw } \underline{x})$. R would be interpreted in the obvious way as an abstraction operator. Now suppose that a wh-NP that is in an ordinary sentence-internal position is preposed in the translation from syntactic to semantic

structure, but one that is in COMP position is merely left in place, with the S translating into a sentence open on some position which in the syntax is 'empty.' Then what few people I saw will translate out as (R x:few people)(I saw x), but with what few people he danced will come out as (with (R x:few people))(he danced ?) or some similar piece of garbage, provided that the wh-phrases are underlyingly initial. I suggest then that it might be the case that (a) semantic interpretation preceeds wh-movement and works in the manner suggested (b) headed relatives and questions don't (or needn't) have their wh NP in COMP position (c) headless relatives require their wh NF to be in initial position. This must, of course, all be regarded as the rankest speculation.

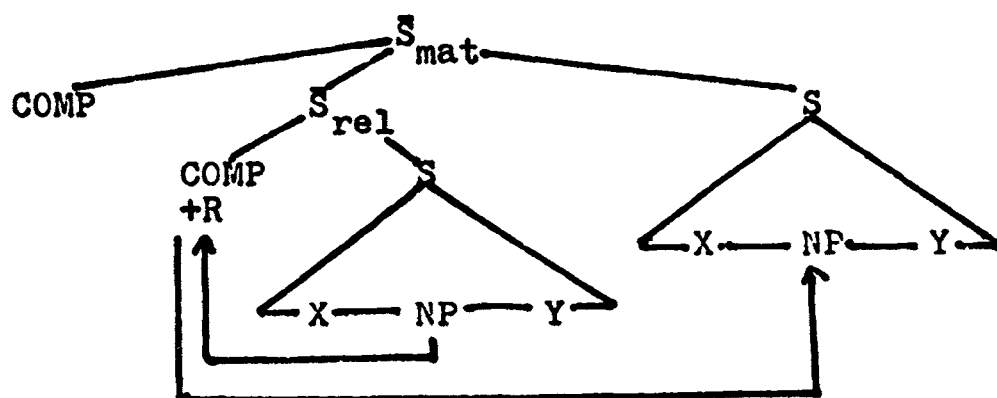
I will close with a final observation. The free and paucal relative clauses would both correspond to restrictive relative clause with definite heads when rendered in a headed construction. Likewise the Navajo relative clause, which (Hale and Platero 1974) suspect to have an underlyingly headless structure (pre-relatives being derived by extraction) also corresponds only to a restrictive relative on a definite head. Such interpretations may then be a universal property of the headless relative, and there may thereby be a way to distinguish pre- and post- relatives that are derived by extraction from those that are not. This too must be regarded as highly speculative.

1.1.3. Adjoined Relative Clauses: Adjoined relative clauses appear not within an NP in their matrix S, but rather at the beginning or the end of that S, possibly separated from their head by an unbounded stretch of material.

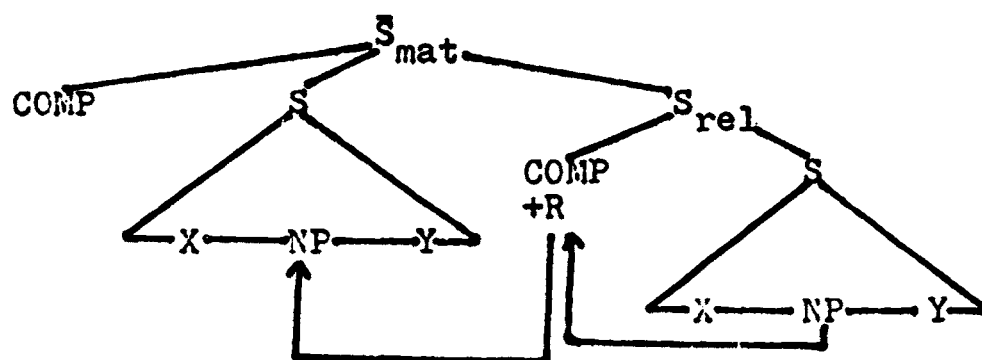
I propose that adjoined relative clauses come in three varieties: anticipatory, extraposed and trailing. Anticipatory and trailing relatives I propose to be generated by a rule $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ S } (\bar{S})$, the first \bar{S} on the right being anticipatory, the second being trailing. Extraposed relatives I propose to be introduced by $S \rightarrow S \bar{S}$. Extraposed relatives are the extraposed relatives familiar from English, while anticipatory and trailing relatives are a type that is present in English only in the form of an assortment of marginal constructions, but is in many languages the major vehicle of relativization. The justifications for distinguishing trailing from extraposed relatives will emerge gradually; essentially the trailing relative is a counterpart to the anticipatory relative, while the extraposed relative is an embedded relative. It will be apparent with a little thought to anyone that my structural proposals are tremendously oversimplified. There is need for a great deal more work on the ways in which subordinate clauses may be attached to the margins of matrices. Nonetheless the present proposal will suffice as a beginning.

We thus attain the following three constituent structures for adjoined relative clauses:

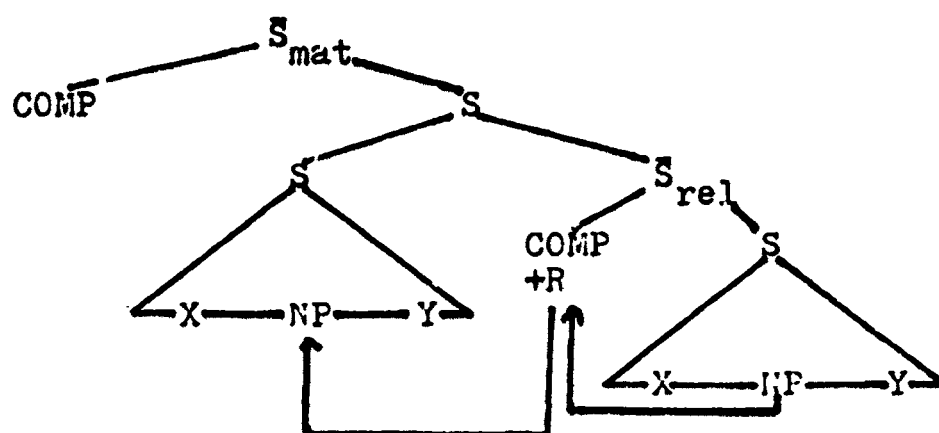
(90) a. Anticipatory Relative:



b. Trailing Relative:



c. Extraposed Relative:



Some languages with anticipatory and trailing relative clauses as major relative clause structures are the following:

(91) Languages with Anticipatory and Trailing Relatives:

| | | |
|---------|------------|----------|
| Walbiri | | Sanskrit |
| Nabuiag | Australian | Bengali |
| Kaititj | | Hindi |
| Papago | | Marathi |
| Hittite | | Bambara |

English and Navajo have extraposed relatives without anticipatory relatives (excepting marginal constructions in English).

I shall first discuss the Australian languages Walbiri and Nabuiag, then the Indic languages Hindi, Sanskrit and Marathi, and finally Navajo and English. Among the highlights will be the exhibition of double headed anticipatory relatives in Sanskrit and Marathi, double headed extraposed relatives in English and Navajo, and finally cases from Marathi and Navajo where adjoined relatives are separated from their heads by unbounded stretches of material. Such a demonstration has also been given for Hindi by (Satyanarayana and Subbarao 1973).

1.1.3.1. Walbiri. This is a somewhat oversimplified account of material presented by Ken Hale in class (1971). I am of course responsible for any errors in the presentation.

Walbiri is a basically SOV language with the very free scrambling and a case system including ergative, absolutive, dative, etc. A constituent with considerable presence in the surface structure is an Aux-node, the contents of which are realized as a single word and which contains tense/aspect and mood markers, as well as agreement morphemes expressing the case and number of various complements

of the verb. Curiously, the case-system of the agreement formatives is nominative-accusative while that of the NP is ergative-absolutive. This suggests that the underlying case system is nominative-accusative, and that after the agreement rule applies, an ergative-absolutive rule applies to the full NP and clauses the earlier nominative-accusative marking to be obliterated.

Walbiri speakers do not like constituents of more than one word length to appear in surface structure, preferring to scramble apart even such constituents as NP consisting of head and adjective or demonstrative. Especially Walbiri speakers do not like embedded S, and sentences with embedded S are definitely ungrammatical in Walbiri. Thus there are both anticipatory and trailing relative clauses, but no embedded relatives.

In a relative clause there is a formative kutja at the beginning of the AUX, to which various tense-aspect and agreement markers (which may add up to \emptyset , since many of them are \emptyset) are added. In the simplest constructions, whichever of NP_{rel} or NP_{hd} comes second may be deleted, or both may be left untouched. It is hence reasonable to believe that in this language the deletions are accomplished by pronominalization, as is not the case in Navajo.

Below are some examples:

- (92) a. timana-lu \emptyset kuḍu kutju-pu
 horse-ERG AUX child throw-PAST
 "the horse threw the child"
- b. natju ka-na-la kuḍu-ku
 I PRES-1-3(DAT) child-DAT
 maritjari-mi
 feel sorry for-NONPAST
 "I feel sorry for the child"
- c. timana-lu kutja kuḍu kutju-pu natju
 horse-ERG REL child throw-PAST I
 ka-na-la (kuḍu-ku) maritjari-mi
 PRES-1-3(DAT) (child-DAT) feel sorry for-NONPAST
 "I feel sorry for the child that the horse threw"
- d. natju ka-na-la kuḍu-ku
 I PRES-1-3(DAT) child-DAT
 maritjari-mi, timana-lu kutja
 feel sorry for-NONPAST horse-ERG REL
 kutju-pu (kuḍu)
 throw-PAST (child)
 "I feel sorry for the child that the horse threw"

The surface independence of the relative clause from its head is shown by the fact that there is no necessary constituent structure relations holding between NP_{hd} and S_{rel} , and also by the fact that the case-marking of NP_{hd} and NP_{rel} is entirely determined by the role each NP plays in its clause.

Sometimes, when under great stress, the Walbiris violate the rule against embedding relative clauses, and then a relative gets stuffed into an NP between the head and the case-marker. In this construction the clauses look like an adjective forming a surface constituent with its head (a stylistically gauche but grammatical construction). I believe that such relative clauses are

ungrammatical because Hale reports that a Walbiri will not admit that he pronounced such a sentence, even if confronted with tape-recorded evidence, much less admit that they are possible in Walbiri.

From this ungrammatical embedded structure one can actually get up an argument against deriving relative clauses from an embedded source: for when an ordinary adjective is ripped out of an NP it takes along with it a copy of the case-marker of the NP. Therefore, if relative clause were to move out of an NP, one would expect it to take with it the case-marker of that NP.

A construction like that of Walbiri obviously puts strong limitations on the number of relative clauses that can occur modifying NP in a single S. The structure I have given permits two, but it is difficult to tell whether two or one is the permitted number. Only one relative clause can occur at either end of the S, but the occurrence of S with relative clauses at both ends as made possible by my $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ S } (\bar{S})$ rule is doubtful. Hale reports that when such structures occur, the following relative clause has very much the flavour of an afterthought. A construction that suggests that the trailing relative clause in such cases is an afterthought is the extremely common construction in which the trailing relative clause is a copy of the anticipatory one, giving such a sentence as the man came yesterday, I hit the man, the man came yesterday as a rendition of I hit the man who

came yesterday. Perhaps the second relative clause is tacked on because the speaker has forgotten about the first. The 'afterthoughtty' character of many trailing relative clauses is interesting in light of the fact that (Thiersch 1974) has observed similar properties of clauses in English that I will in section 1.1.3.7. analyse as trailing clauses.

I have already noted that of NP_{rel} and NP_{hd} , whichever comes second is optionally deletable, and since Walbiri has widespread deletion of anaphoric pronouns, we can safely assume that this optional deletion is accomplished by pronominalization. There are other more complicated configurations involving determiners in which NP_{rel} and NP_{hd} may appear, but since I have not determined their relation to other sorts of anaphoric processes I shall not discuss them here.

Walbiri supports the $\bar{S} \rightarrow COMP (\bar{S}) S (\bar{S})$ rule inasmuch as (a) there is no evidence that relative clauses are extracted from their heads (b) if relative clauses were extracted from their heads there would be no way to capture the one-to-a-side restriction.

1.1.3.2. Mabuiag: I will here briefly sketch some of the results arrived at by T. Klokeid (1970) in his research on Mabuiag, another Australian language. Klokeid identifies three types of relative clauses: participials, which appear to be some sort of reduced relative and are hence beyond the scope of this paper; full relatives with

a wh word and full relatives without such a word. The former type occurs in both anticipatory and trailing position, the latter only in trailing position.

I will first discuss the clauses without a wh-word. These clauses are always anticipatory, and NP_{rel} remains a full NP within them, exactly as it would in an unembedded S. NP_{hd}, which always follows the relative clause, may either be deleted or pronominalized. Deletion is a regular alternative to pronominalization. One suspects that NP_{hd} could also be left intact, but Klokeid does not give us information on this point.

Some examples are:

- (93) a. moegekez_i uzarai-dhin Fanai-ka, Zon {[∅]_i-ka_i}
 child go-PAST Panai-DAT John him-DAT
 mulai-dhin
 talk-PAST

"John talked to the child who went to Panai"

- b. moegekazi-n_i gulaig_j gasam-dhin, {[∅]_i hui_i or j_j}
 child-ERG captain touch-PAST he_i or j_j
 uzarai-dhin Panai-ka
 go-PAST Panai-DAT

"The child who touched the captain went to Panai"

"The captain who the child touched went to Panai"

The same essential considerations apply here as do in Walbiri: there is no compelling reason for deriving these clauses from anywhere but from where they appear in surface structure.

These relative clauses are identical in form to a sort of because-clause. In the because clause there needn't be any NP coreferential with anything in the main clause,

but if there is it gets pronominalized or deleted just as when a relative clause is present. Hence the examples of (93) also have the because-clause readings "John talked to the captain because he went to Panai" and "the captain went to Panai because the child touched him" or "the child went to Panai because he touched the captain." Therefore if the base rules which generated the because clauses also generated the anticipatory relative clauses, no great syntactic implausibilities would result.

The other form of relative clause uses a 'wh' word ngadh (occurring, of course, in many case-forms) as a relative pronoun or relative determiner of NP. One would of course presume that the uses as pronoun and determiner are in fact the same, the pronominal use being when pronominalization has removed the rest of the NP. ngadh is also used as the interrogative pronoun-determiner, as well as as an identity-of-sense pronoun like English one in a red one. Clauses with ngadh can never be interpreted as because-clauses, and they may either precede or follow the matrix. They may also occur as post-relatives, but this construction is strained and is said to have wierd intonation.

Some examples of relative clauses with ngadh are the following:

- (94) a. ngadh mabaig-an os guudthapam-dhin
 Wh-ERG man-ERG horse kiss-PAST
 uzarai-dhin Bessai-da
 go-PAST Bessai-DAT
 "the man who kissed a horse went to Bessai"
- b. mabaig uzarai-dhin Bessai-ka, ngadh mabaig-an
 man go-PAST Bessai-DAT wh-ERG man-ERG
 os guudthapam-dhin
 horse kiss-PAST
 "the man who kissed a horse went to Bessai"
- c. Zon mabaig, ngadh os guudthapam-dhin,
 John man wh-ERG horse kiss-PAST
 matham-dhin
 mit-PAST
 "John hit the man who kissed the horse"

The greater positional freedom of the clause with ngadh is probably a consequence of the fact that it contains a signal that it is a subordinate clause: if the relative clause without ngadh were permitted to occur both at the beginning and the end of the main clause, it would be impossible to tell which was which. I am not sure how such a constraint should be built into the grammar.

Mabauig is like Walbiri in having relative clauses introduced by the $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ } S \text{ } (\bar{S})$ rule, and in having pronominalization processes be the ones responsible for reducing whichever of NP_{hd} and NP_{rel} gets reduced, but unlike Walbiri, it optionally has a special determiner for NP_{rel} , and there is a slight possibility for there to be post-relative clauses of some sort as well. We shall see that on the whole the relative clauses introduced by $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ } S \text{ } (\bar{S})$ do not have special rules deleting NP_{rel} .

1.1.3.3. Hindi: In this subsection I will briefly summarize the main points of relativization in Hindi as described by (Donaldson 1971). Relative clauses may be anticipatory, trailing, or embedded as post-relatives. NP_{rel} has a relative determiner jo (occurring in many inflectional forms) which is distinct from the interrogative pronoun. NP_{hd} has the demonstrative determiner vah (also occurring in many inflectional forms) which normally means 'that.' As in the preceding languages, whichever of NP_{rel} and NP_{hd} comes first has everything but the determiner optionally deleted, presumably by pronominalization. Hence Hindi is essentially similar to Mabuiag. Hindi provides the pattern for the other Indic languages: hence I will discuss in later sections examples from Sanskrit and Marathi without going into great detail with these languages.

Below are a series of examples from Hindi, first preposed relatives, then extraposed, and finally post-relatives:

- (95) a. jo larka mere pas rāhta hai, vah mera
 wh boy me near lives that my
 chota bhāi hai
 little brother is
 "the boy who lives near me is my little brother"
- b. mere pas jo larka rāhta hai, vah mera
 me near wh boy lives that my
 chota bhāi hai
 little brother is
 "the boy who lives next door to me is my little brother"

- c. jo per nadii ke kinare par tha, pakshii
 wh tree river of bank on was bird
 us par baiṭha tha
 that on sitting was
 "the bird was sitting on the tree that was on
 the bank of the river"

(95b) reveals that the wh-word needn't front, while (95c) shows S_{rel} and NP_{hd} separated by the subject of the matrix S, so that they cannot be a constituent.

- (96) a. vah larṅka mera chota bhaii hai, jo mere
 that boy my little brother is wh me
 pas raḥta hai
 near lives
 "the boy who lives near me is my little brother"
- b. gay sarak calii ja rāhii thii, log jis
 cow street on going was people wh
 par baithe hue the
 on sitting were
 "the cow was walking on the street on which
 people were sitting" (I don't understand
 why there is no vah with sarak)
- (97) a. Ram ne, jo amir hai, ek maṅkan khariida
 Ram INSTR wh rich is a house bought
 "Ram, who is rich, bought a house"
- b. us admi ne, jo amir hai, ek maṅkan khariida
 that man INSTR wh rich is a house bought
 "the man who is rich bought a house"

The instrumental cases on the subject NP in the matrices of (97) are due to the fact that in certain tenses, the subject is put in the instrumental.

There are various special points to be made. First, when the head noun is definite, as we have seen, it usually acquires the determiner vah 'that.' Ordinary definite NP bear no determiner at all. But if the head NP bears the

determiner yah 'this,' it keeps this determiner as shown in (98) below:

- (98) yah kal shant nahii hai jisme ham rahte hai
 this age peaceful not is wh-in we live
 "this age in which we live is not peaceful"

Secondly, there is a restriction that if the head NP is indefinite, with the determiner ek 'a, one,' then the relative clause must follow the head:

- (99) a. us ne ek jhiil dekhi jo bahut bari thi
 he INSTR a lake saw wh very big was
 "he saw a lake which was very big"

b. *jo jhiil bahut bari thi, us ne ek dekhi

Finally, there is a restriction that nonrestrictive clauses such as those of (97a) can occur only in post-relative position, not as trailing or anticipatory relatives. Hence one has the following:

- (100) a. *ram ne ek mkan khariida jo amir hai
 Ram INSTR a house bought wh rich is
 b. us admii ne ek mkan khariida jo amir hai
 that mar. INSTR a house bought wh rich is
 c. *jo ram amir hai us ne ek mkan khariida
 wh Ram rich is he INSTR a house bought
 d. jo admii amir hai us ne ek mkan khariida
 wh man rich is he INSTR a house bought

I suspect that the constraint that anticipatory relatives require definite heads is universal. It holds in the other Indic languages (making certain allowances), and Hale suspects that it is also true of Walbiri. Inasmuch as restrictive relatives with definite heads are generally 'old information,' this may be related to the tendency for

information to appear first. Also this construction might be related to the 'left dislocated' structures of such examples as the guy who did that, I think he should be shot.

1.1.3.4. Sanskrit: Inasmuch as the adjoined relative clause constructions do not have to form constituents with their heads, there is no reason why they should be restricted to having one head, or even one wh word.

Examples of multiple headed relative clauses may be found in Classical Sanskrit, such as the following:

- (101) a. yasya, yat, paitṛkam ritkam
 who:GEN what:NOM paternal:NOM inheritance:NOM
sa, tad, grhṇīta, netarah
 he:NOM that:ACC should get not another
 "of whom what is the paternal inheritance,
 he should get it and not somebody else"
- b. yena yāvān yathā
 who:INSTR to what extent in what manner
 'dharma dharma vaha samīhitia, sa eva
 inustice justice or is done he exactly
tatphalam būṅkte tathā
 the fruits thereof will enjoy in that way
tāvad amutra vai
 to that extent in the other world indeed

In (101a) we have the wh relative words (the simple ya series is used only as a relative pronoun, although more complex forms built on ya have other uses) yasya and yat, which are NP_{rel} correlating with demonstratives sa and tad, NP_{hd} in the main clause. In (101b) the wh relative words are yena, yāvān and yathā correlating with sa, tāvad and tathā.

If the reader, upon looking at these sentences, feels at a loss as to how to interpret them, then there is a simple

algorithm for constructing a paraphrase. Replace the wh words with indefinites in some, and recast the relative clause as a conditional. Thus one obtains: "if someone has something as a paternal inheritance, then he should get it and not someone else," "if someone does good or evil to some extent in some way, then he shall enjoy the fruits thereof in the next world to that extent and in that way."

I am informed that multiple headed relative clauses in Sanskrit characteristically have this property of being 'generic' statements of laws. One might think, therefore, to derive them from conditionals in some fashion. While this might suffice in Sanskrit, we will find in Marathi examples of multiple headed and multiple wh-worded relative clauses which are not generic, but rather referential.

One might also think of associating the generic anticipatory relative clause with the anticipatory wh-ever clause of English, exemplified in (102):

(102) whoever steals my chickens, I'll set my dogs on him
We may note, however, that the wh-ever clause of English
(a) allows only one wh-ever word (b) does not require
a correlative definite in the matrix for every wh-ever word
in the subordinate clause:

(103) *whoever gives whatever to Lucy, she'll thank him
 for it

(104) whoever gets the job, I'll be displeased

(104)-like structures are impossible with these constructions.

1.1.3.5. Marathi,⁵ Relativization in Marathi is roughly comparable to relativization in Sanskrit, but is made much more complex by the presence of a bewildering variety of alternative constructions. These are discussed by (Junghare 19??). I will make no attempt to review them here, but will rather exhibit a number of phenomena that are of theoretical interest using the more straightforward constructions.

Marathi is an SOV language with scrambling. It has postpositions and many following conjunctions, although some conjunctions, such as ki 'that,' precede their clauses (as predicted by (Kuno 1974), ki clauses are obligatorily extraposed to post-verbal position), and other words that correspond to conjunctions in English, such as jar 'if' and jarī 'although,' may occur within their clauses as if they were adverbs.

There are four cases: nominative, dative-accusative, instrumental and genitive. The marker of the nominative is null. The dative-accusative has a marker la which is obligatory with humans, optional with animals, and omitted with inanimates. The marker of the instrumental is ni, and the genitive is marked by c+Agr, where Agr is a formative expressing the gender and number of the head N which the genitive NP modifies. The genitive marker takes the form jha when the possessed NP is masculine singular.

In intransitive sentences, of course, the subject is nominative. In a transitive sentence in the present tense, the subject is nominative and the object is dative-accusative. In a transitive sentence in the past tense the subject is instrumental and the object remains in the dative-accusative. There is finally a construction taken by many 'psychological' verbs such as awar 'like' in which the experiencer-of-affect takes the dative-accusative and the object-of-affect takes the nominative. In this construction the unmarked order is experiencer-object-verb; hence the dative-accusative is occupying the constituent structure position of the subject, and the nominative the position of the object. Verbs agree with their subjects and objects in person, gender and number in complex patterns which I will not describe.

We will be much concerned with the two determiners i 'wh' and t 'th.' Both may be used as determiners preceding their heads, or independently as pronouns. When used as pronouns they take the case endings that would otherwise appear on the head N. Hence we have Yi muli-la 'what girl-DA,' Yi-la 'who:FEM-DA.' i is used on NP_{rel} of relative clauses, but not as an interrogative, and t is used as a demonstrative pronoun/definite article, as well as on the NP_{hd} of relative clauses.

As in Hindi, we can find restrictive relative clauses preceding or following the matrix, NP_{rel} marked with i, NP_{hd} with t, and optional deletion of the head N

of whichever NP comes first:

- (105) a. $\tilde{m}\tilde{i}$ $\tilde{j}i$ muli-la pahili, $m\tilde{o}$ -la ti (mulgi) awarte
 I:INSTR wh girl-DA saw I-DA th (girl) like
 "I like the girl who I saw"
- b. $m\tilde{o}$ -la ti mulgi awarte, $\tilde{m}\tilde{i}$ $\tilde{j}i$ (muli)-la pahili
 I-DA th girl like I:INSTR wh (girl)-DA saw
 "I like the girl who I saw"

The relative clauses in these examples illustrate the instrumental - dative-accusative construction in the past tense, and the matrices illustrate the dative-accusative - nominative construction with psychological verbs. The first, rather than the second instance of the head may be deleted under various circumstances which I do not understand and will not undertake to report.

(Jungare 19??) analyses restrictive relative clauses as being extracted from within the NP they modify, a view that we have rejected for Walbiri and Mabuig due to the absence of any convincing evidence to support it. In Sanskrit we found evidence against the view in the form of double and triple headed relative clauses, but the evidence was weakened in the light of the fact that the clauses receive an interpretation which make them semantically similar to conditionals. I will exhibit referential multiple headed relative clauses in Marathi, but first I will discuss a relation between the position of a relative clause and its semantic interpretation.

The sentence Ram thinks that the woman who is in the kitchen is not in the kitchen is said (see Postal 1974) to have a reading in which a woman is in the kitchen and Ram thinks that

she is not in the kitchen, and a reading in which Ram holds the contradiction that the woman who is in the kitchen is not in the kitchen. Following the philosophical tradition, these readings are generally called the transparent and the opaque readings, respectively.

In Marathi these readings may be distinguished by the positioning of the relative clause: if it is placed initial to the matrix clause, we get the transparent reading; if it is placed initial to the complement clause we get the contradictory opaque reading. (106a) is the matrix with no relative clause, (106b) has the relative clause attached to the matrix to yield the transparent, coherent reading, and in (106c) the relative clause is attached to the complement to yield the contradictory opaque reading:

- (106) a. Rama-la waṭṭe ki ti bhai kiṇ mādhe nahi
 Ram-DA thinks that th woman kitchen in is not
 "Ram thinks that the woman is not in the kitchen"
- b. Ji bhai kiṇ mādhe ahe, Rama-la waṭṭe
 wh woman kitchen in is Ram-DA thinks
 ki ti (bhai) kiṇ mādhe nahi
 that th (woman) kitchen in is not
 "Ram thinks that the woman who is in the kitchen
 is not in the kitchen (transparent & Ram sane)"
- c. Rama-la waṭṭe ki Ji bhai kiṇ mādhe ahe
 Ram-DA thinks that wh woman kitchen in is
 ti (bhai) kiṇ mādhe nahi
 th (woman) kitchen in is not
 "Ram thinks that the woman who is in the kitchen
 is not in the kitchen (opaque & Ram crazy)"

Note that the relative clause goes between ki and the complement

S, justifying the order of elements in the $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ S } (\bar{S})$ rule.

This rule is further justified by the fact that no relative clauses cannot occur initially. Similarly, various sorts of adverbial clauses, such as conditionals in jer...tar... cannot cooccur initially with relative clauses, showing that they too occupy this slot:

- (107) a. *jo mulga kičən mādhe ahe, ji bhai ajari ahe,
 wh boy kitchen in is wh woman sick is
 tya-ni ti-la mārət keli
 th(masc)-INST th(fem)-DA help did
 "The boy who is in the kitchen helped the woman who is sick"
- b. *jer to ghcra jinkel, jo mulga kičən mādhe
 if th horse wins wh boy kitchen in
 ahe, mi tar tya-la marin
 is I:NOM then th(masc)-DA will hit
 "If that horse wins, then I will kill the boy who is in the kitchen."

Inasmuch as I later wish to relate jer...tar conditionals and related structures to relative clauses, this result is advantageous. I have not investigated the behaviour of trailing clauses, or of combinations of anticipatory and trailing clauses.

I now turn to multiple headed relatives. Below is a series of double headed relative clauses, the first three anticipatory, the last one trailing:

- (108) a. jo mulga ja muli-la pahato, *(tya) mula-la
 wh boy wh girl sees th boy-DA
 *(ti) mulgi awarte
 th girl likes
 "The boy who sees the girl likes her."

- b. $\check{Y}a$ mula-ni $\check{Y}a$ muli-ca dueś kela
 wh boy-INST wh girl-GEN hatred did
 tya-ni ti-la marli
 th(masc)-INST th(fem)-DA killed
 "The boy who hated the girl killed her."
- c. $\check{Y}a$ mula-ni $\check{Y}a$ muli-la mārət keli,
 wh boy-INST wh girl-DA help did
 to ti-la marli
 th(masc) th(fem)-DA killed
 "The girl who the boy helped liked him."
- d. tya mula-ni tya muli-la marli
 th boy-INST th girl-DA killed
 $\check{Y}a$ -ni $\check{Y}i$ -ca dueś kela
 wh(masc)-INST wh(fem)-GEN hatred did
 "The boy who hated the girl killed her."

The translations given are ambiguous. The meanings of the examples are best given in logicales. (108a) for example means that for the unique ordered pair (\underline{x} , \underline{y}) where \underline{x} is a boy and \underline{y} is a girl and \underline{x} sees \underline{y} , \underline{x} likes \underline{y} ; and similarly for the others. I believe that the translations given have these readings along with others.

Inasmuch as these examples are of considerable importance, it is worth mentioning that I have found them with three different speakers, the first of whom volunteered one in the course of a discussion of the Sanskrit examples in the previous subsection. He said that although referential multiple headed relatives were unnatural in Sanskrit, they were acceptable in his own language. I have tried (not very hard) with no success to elicit them in Bengali, and Keenan has tried with limited success to get them in Hindi (verbal

communication).

We may observe in (108a) that each j-word in the relative clause must have its corresponding t-word in the matrix. This shows that this relative clause construction really does involve multiple NP_{rel} - NP_{hd} connections. Skepticism on this point may be further abated by observing that a multiple j-word relative clause may be used to answer a multiple k-word (interrogative) question:

(109) Q: *konta mulga kontya muli berober dating karto?*
 which boy which girl with dating does

A: *Ja-la Yi awarte*
 wh(masc)-DA wh(fem) likes

Q: "Which boy is dating which girl?"

A: "who likes who."

The answer is presumably a reduced form of Ja-la Yi awarte, to mulga tya muli berober dating karto, which is of the same general form as the clauses of (108) except that pronominalization between NP_{rel} and NP_{hd} goes backwards.

These constructions have about them somewhat of the air of Bach-Peters sentences. This is not surprising, inasmuch as one of the more obvious ways to go about providing a semantics for them would be to revise the device of the 'double NP' proposed by Keenan (1972, pp. 458-459) to do the semantics for Bach-Peters sentences.

I observed in the discussion of Hindi that a relative clause could modify an indefinite NP if it followed the matrix, but not if it preceded:

- (110) a. $\tilde{m}\tilde{i}$ eka muli-la bhetla, mɔ-la $\check{y}i$ (mulgi) awarte
 I:INST a girl-DA met I-DA wh girl like
 "I met a girl who I like"

b. *mɔla $\check{y}i$ mulgi awarte, $\tilde{m}\tilde{i}$ eka mulila bhetla

Relative clauses following indefinite heads can also be multiple headed:

- (111) ek mula-ni eka muli-la bhetla, $\check{y}a$ -la $\check{y}i$
 a boy-INST a girl-DA met wh(masc)-DA wh(fem)
 awarte .
 likes
 "a boy met a girl and he likes her"

This construction has a flavour of 'afterthoughtiness' about it, and we find that it cannot be used with interrogatives and indefinites that are controlled by negatives:

- (112) a. tu . kona-la pahila
 you who-DA saw
 "who did you see?"
 b. *tu . kona-la pahila jo ghorya-la marat hota
 you who-DA saw who horse-DA killing was
- (113) a. $\tilde{m}\tilde{i}$ kunalahi pahila nahi
 I:INST anybody(DA) saw NEG
 "I didn't see anybody"
 b. * $\tilde{m}\tilde{i}$ kunalahi pahila nahi jo ghorya-la
 I:INST anybody(DA) saw NEG wh horse-DA
 marat hota
 killing was

This fact suggests that the clauses are in fact nonrestrictive, and this claim would follow from the general claim made by Junghare that relative clauses without to are non-restrictive.

Before leaving the subject of multiple headed relative clauses I will mention the fact that Schwartz (1971) claimed

that they existed in Telugu in a relative clause construction of the same general form as Indic. The construction was, of course, borrowed from Indic. Our observation of the type of structure was independent.

The anticipatory and trailing relative clause structures are also used to express various adverbial ideas. For example jevha...tevha... express when...then..., and jithe...tithe... express where...there.... Hence we have the following:

- (114) a. $\overset{\vee}{m\bar{i}}$ $\overset{\vee}{j}evha$ alo, $\overset{\vee}{t}evha$ to joplela hota
 I:INSTR when came then he sleeping was
 "when I arrived he was sleeping"
- b. to $\overset{\vee}{t}evha$ dokya w $\bar{a}r$ obha hota, $\overset{\vee}{j}evha$
 he then head on standing was when
 $\overset{\vee}{m\bar{i}}$ alo
 I:INST came
 "he was standing on his head when I arrived"
- (115) a. $\overset{\vee}{j}ithe$ saw $\bar{a}li$ hoti, $\overset{\vee}{t}ithe$ Ram b $\bar{a}sla$
 where shade was there Ram sat down
 "where there was shade Ram sat down"
- b. Ram $\overset{\vee}{t}ithe$ b $\bar{a}sla$, $\overset{\vee}{j}ithe$ saw $\bar{a}li$ hoti
 Ram there sat down where shade was
 "Ram sat down where there was shade"

The anticipatory structure appears to be formally parallel with the English "when I arrived, then I sat down." I personally reject examples with where...there..., such as where we found a four leaf clover, there we built a hut, but this judgement is not universal.

(Geis 1970) argued that adverbial clauses fell into two types: those related to relative clauses on nouns,

such as when and where clauses, and those related to complement clauses on nouns, such as if and although clauses (consider the expressions on the condition that... and in spite of the fact that...). The evidence from Marathi undercuts this distinction. For not only do we have the abovementioned pairs, but also jar...tar... for if...then... and jar...tar... for although...in spite of that. Hence corresponding to (114) and (115) we have (116) and (117):

- (116) a. jar to itha yel, tar mi tya-la
if he here comes then I:INST he-DA
goli marin
bullet will kill
"If he comes here, then I'll kill him"
- b. mi tar tya-la goli marin, to jar
I:INST then he-DA bullet will kill he if
itha yel
here comes
"If he comes here, then I'll kill him"
- (117) a. jari tya-ni majha kutrya-la marla
although he-INST me:GEN dog-DA killed
to ri me-la to awarto
"thalthough" me-DA he likes
"although he killed my dog, in spite of that
("thalthough") I still like him"
- b. me-la tari to awarto, majha kutrya-la
I-DA "thalthough" he likes me:GEN dog
jari marla
although killed
"although he killed my dog, in spite of that
I still like him"

The fact that jar, tar, jar and tari needn't occur clause initially, but rather may occur fairly freely

within their clauses suggests that they are not conjunctions (occupants of COMP) but are rather like adverbs. jevha, tevha, jithe and tithe appear to position themselves in roughly the same way as do these other words.

We might still wish to dismiss this situation as a purely adventitious morphological paralellism, but there is deeper evidence of a syntactic relation between jar... tār... and jarī...tārī... and the relative clause. Trailing relative clauses may have the appropriate t-word repeated after them. Hence we have (118):

- (118) to manus ajari ahe jo itha kam karto to
 th man sick is wh here work does th
 "the man who works here is sick"

Correspondingly we have the following examples with the adverbial words:

- (119) a. to tevha dokya war obha hota, jevha
 he then head on standing was when
 mī alo tevha
 I:INST came then
 "when I came, then he was standing on his head"
- b. Ram tithe basla, jithe sawali hoti tithe
 Ram there sat down where shade was there
 "Ram sat down where there was shade"
- c. mā-la tārī to awarto, jarī majha
 me-DA "thalthough" he likes although my
 kutrya-la marlā tārī
 dog-DA killed "thalthough"
- d. mī tār tya-la sangin jar mī
 I:INST then he-DA will tell if I:INST
 tya-la bhetlo tār
 he-DA meet then

'if' and 'although' in Marathi thus seem closely related to

the relative clause construction in this language.

The problem raised by these examples is that it is difficult to think of how a semantics of the sort that one might envision for relative clauses would extend in any straightforward way to these 'conjunctions.' I will venture the suggestion that perhaps treating the conjunctions with explicit quantification over possible worlds in a fashion suggested, but not explained, by Postal (1974) would provide a satisfactory solution.

In English also we can find relative-like conjunctions. Consider first that the if in the if...then... construction is also used as a wh-word in indirect questions: I don't know if he will come. Second, observe that as...so... form a clearly correlative pair in as ye sow, so shall ye reap and other examples of that ilk. Now in poetry and elevated prose we may find as...so.. pairs which are not ordinary relative pronouns, but rather relate a clause giving grounds to one giving the consequence, in a construction that is a non-adversative counterpart to the Marathi jari...teri construction. An example of this usage is the following passage from T. S. Eliot's "Little Gidding:"

But, as the passage now presents no hindrance
 To the spirit unappeased and peregrine
 Between two worlds become much like each other,
 So I find words I never thought to speak
 On streets I never thought I should revisit
 When I left my body on a distant shore.

To conclude the discussion, we have shown that Marathi relative clauses may have multiple wh words and multiple heads, thus scotching any hope for a universal derivation of relative clauses from clauses forming a constituent with their head, we have shown some differences between anticipatory and trailing clauses, and we have claimed that lurking among the straightforward relative clauses are a class of clauses that from conventional treatments of semantics one would not expect to betray significant syntactic relations to relative clauses. Marathi is clearly a language worthy of further investigation.

1.1.3.6. Navajo: In this section I will give more thorough consideration to the extraposed relative clause in Navajo, and will contrast it with the extraposed relative in English. The Navajo material here is drawn from (Perkins 1975).

The extraposed relative in English obeys the constraint (with various sorts of loopholes, most of which I shall ignore) that the head and the relative clause cannot be separated by another NP. Hence while (120) is acceptable, (121) is not ambiguous:

(120) a woman came in who was tall

(121) a boy kissed a girl who was tall

In Navajo on the other hand there is no such constraint. Hence (122a) is doubly, and (122b) triply ambiguous:

- (122) a. ashkii at'éeéd yoo'í hashtl'izh
 boy girl 3:PROG:3:see mud
 yíih-yítlizh-ée
 3:in-PERF:3:fall-REL
 "the boy who fell in the mud sees the girl"
 "the boy sees the girl who fell in the mud"
- b. ashkii at'éeéd ɬíí' ye-inílooz
 boy girl horse 3:to-3:PERF:3:led
 ba'níltsood-ée
 3:PERF:1:feed-REL
 "the boy whom I have fed led the horse to the girl"
 "the boy led the horse to the girl whom I have fed"
 "the boy led the horse which I have fed to the girl"

This Navajo extraposed relative is less restricted than the English in yet another fashion. Extraposition rules in English are subject to an ironclad constraint against extracting elements from subject clauses. Hence we have (123):

- (123) a. that a woman has arrived who knows French is good.
 b. *that a woman has arrived is good who knows French

In Navajo we find these data exactly reversed:

- (124) a. *lééchaa'í iisxí-nígíí
 dog PERF:3:kill-REL
 ba'níltsood-ée ya'at'éeéh
 3:PERF:1:feed-REL it is good
 "it is good that the dog which I have fed has killed something"
- b. lééchaa'í iisxí-nígíí ya'at'éeéh
 dog PERF:3:kill-REL it is good
 ba'níltsood-ée
 3:PERF:1:feed-REL

(124a), in which the relative clause ba'níltsoodée 'which I have fed' has been extraposed to the end of the subject complement lééchaa'í iisxínígíí 'that the dog has killed

something,' is ungrammatical. (124b), where the extraposition has proceeded to the end of the sentence, is acceptable. The ungrammaticality of (124a) I shall deal with later. For the present, let us meditate on the acceptable (124b) in contrast to the English examples (123).

(Ross 1967) on the basis of a variety of evidence including sentences like (123) arrived at the following proposed constraint on transformational application (Ross 1967, ex. 5.58):

- (125) Any rule whose structural index is of the form ...A Y, and whose structural change specifies that A is to be adjoined to the right of Y, is upward bounded.

However there is another constraint proposed by Ross that can explain (123), the Sentential Subject Constraint (Ross 1967, ex. 4.254):

(126) The Sentential Subject Constraint:

No element dominated by an S may be moved out of that S if that node S is dominated by a node NP which is itself immediately dominated by S.

The reader may observe that the crucial evidence in the discussion that motivates (125) (sections 5.1.1.-5.1.2.) is all explicable by the Sentential Subject Constraint.

We have for example the following pairs:

- (127) a. that it was obvious that Bob was lying is not true
 b. *that it was obvious is not true that Bob was lying
 (5.18)

- (128) a. a proof that the claim had been made that John
 had lied was given

- b. *a proof that the claim had been made was given
that John had lied (2.9)

(129) a. that Sam didn't pick those packages up which
are to be mailed tomorrow is possible (5.22c)

- b. *that Sam didn't pick those packages up is
is possible which are to be mailed
tomorrow (5.21)

(130) a. that a review came out yesterday of this article
is catastrophic (5.55a)

- b. *that a review came out yesterday is catastrophic
of this article (5.55b)

These examples illustrate the phenomenon with ordinary
Extraposition, Extraposition of Relative Clauses and
Complements from NP and Extraposition of PP.

Let us try to construct a series of examples testing
for (125) (which I shall henceforth call the Right Roof
Constraint) in examples where the Sentential Subject
Constraint does not interfere:

(131) a.?*Bill said that it would be difficult in his
memorandum to get the project funded

b.?*You promised that a person would come on the
telephone who would fix the refrigerator

c.*he admitted that the hypothesis had been
disconfirmed in his paper that quarks were
the major ingredient in baby food

d.?*you said that a man would come today.
yesterday who would fix the faucet

e.?*the professor announced that he had stolen
a vase in class from the most closely guarded
temple in India

These are all rather bad, but they hardly constitute an
overwhelming battery of evidence, and to my ear they
are not as bad as the (b) examples of (127-130).

If an alternative explanation for (132) can be worked out, which wouldn't surprise me (perhaps on the basis of their ungainly constituent structure), then it might be possible to remove the Right Roof Constraint from the grammar of English. In light of Perkins' and Kaufman's work on Navajo and Satyanarayana and Subbarao's (1973) work on Hindi and Telugu, this would constitute an advance.

(124b) requires not only that there be no Right Roof Constraint in Navajo, but also that there be no Sentential Subject Constraint. Happily, this has already been suggested on independent grounds. (Platero 1974, pp. suggests that Navajo relativization does not obey a Sentential Subject Constraint, but instead suffers from a idiolectally varying disability against relativizing into nominal complements. The extraposition process discussed by Perkins would appear to be immune from this disability.

Perkins gives examples that show that a relative clause may be extracted from several clauses deep, but may not be left at the end of any of the intervening clauses. Hence we have the acceptable (133a) and the series of failed variants (133 b, c):

- (133) a. *lééchaa'í biladideeshdooł nisin dishní*
 dog 3:FUT:1:shoot 1:want PERF:1:say
 shishxash-éé
 1:PERF:3:bite-REL
 "I said that I wanted to shoot the dog that bit me"

- b. *lééchaa'í biladideeshdooł shishxashéé nisin dishní
 c. *lééchaa'í biladideeshdooł nisin shishxashéé dishní

Perkins further observes that although a relative clause can be extraposed from within a sentential subject, one cannot be extraposed from within a relative clause or a coordinated NP:

- (134) a. lééchaa'í nahal'in-éé dóo mási ahigá
 dog IMP:3:bark-REL and cat RECIP:IMP:3:fight
 "the dog that was barking and the cat are fighting"

- b. *lééchaa'í dóo mási ahigá nahalínéé

- (135) a. hastiin dibé ba'níltsood-éé
 man sheep 3:PERF:1:feed-REL
 neís'áh-éé adeeshgizh
 3:PERF:3:butcher-REL REFL:PERF:3:cut

"the man who butchered the sheep which I have fed cut himself"

- b. *hastiin dibé heís'ahéé adeeshgizh ba'níltsoodéé

We are thus confronted with what appears to be an argument that Navajo actually has a rule extraposing relative clauses from their heads: some although not all of the island constraints are obeyed, and we could explain the requirement that the extraposed clause wind up at the end of sentence by having the extraposition rule be a root transformation.

Nonetheless, mortal counterevidence to this picture exists. Perlmutter and Ross (1970) observed the following sentence pattern in English:

- (136) a man came in and a woman went out who were similar
 I proposed in the introduction to this chapter that this example had the deep structure (3). The fact that the

predicate of the relative clause requires a plural subject prevents it from being derived by Extraposition and Right Node Raising from a pair of relative clauses, one in each conjunct.

We can find examples of this form in Navajo:

- (137) ashkii yah 'ííyá dóó at'eéd ch'in-ííyá
 boy into PERF:3:go and girl out-PERF:3:go

ahhinoolin'-ee
 RECIP:3:look like-REL

"a girl came in and a boy went out who were similar"

We can also find in Navajo examples of a form impossible in English. In English the two heads for the relative clause have to be in different conjuncts of a coordinate clause. Hence we cannot say (138):

- (138) *the dog is chasing the cat which were fighting

But the corresponding structure is perfectly acceptable in Navajo:

- (139) léechaa'í masí yinoolchéél ahigán-ee
 dog " cat 3:PROG:3:chase RECIP:IMP:3:fight-REL

"the dog is chasing the cat which were fighting"

In light of the Navajo, it is the *(138) of English that is problematical. I would propose that the explanation for *(138) is the same as the explanation for the non-ambiguity of (121). The nonambiguity of (121) shows that there is in English a constraint preventing there from being an NP intervening between a relative clause and its head. This principle would prevent which were fighting from taking dog as a head in (139) due to the intervention of cat.

Failure of number agreement then renders the example ungram-

matical. Navajo, which lacks this constraint, thus lacks has ambiguity in sentence patterns corresponding to (121) and allows sentence patterns like (139).

Why doesn't the constraint on intervention block (136)? This is presumably a consequence of the general nature of 'Across-the-board' phenomena in coordinate structures. For the present I shall merely say that when the constraint is presented with a coordination of structures, it applies in each conjunct individually, and not to the coordinate structure as a whole. This proposal predicts that (140) should be unambiguous:

(140) a man saw a woman and a boy saw a girl who were
similar

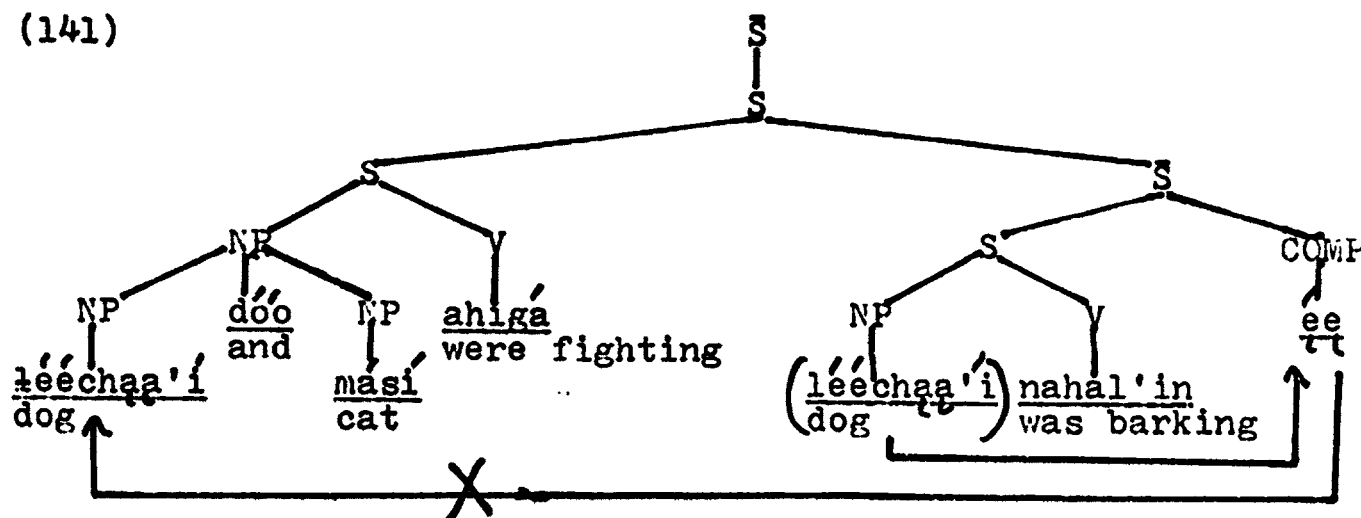
The relative clause should modify woman and girl. As best I can tell, this prediction is borne out.

The proposal that extraposed relatives in Navajo are base-generated in the position they occupy in surface structure appears to contradict the testimony of the evidence that that there is a root transformation of Extraposition that obeys island constraints. We can explain why a relative clause can only be extraposed to the end of the main clause by noting that Navajo is absolutely rigid in its requirement that any subordinate clause end with the verb of that clause. (Platero 1974) notes processes that may extrapose the subject of a main clause to the end of the clause beyond the verb, but these possibilities of movement are completely absent in subordinate clause. By imposing the

surface requirement that a subordinate clause end with its verb, we may account for the apparent evidence that Extraposition is a root transformation.

Now for the island constraints. (Bresnan 1974b) attacks the notion that island constraints constitute diagnostics for movement by showing that they constrain a deletion rule. I propose that these facts from Navajo be taken as evidence that island constraints apply between elements that are related by no transformational rule at all, but rather are connected by the sorts of extra-constituent structure relations that I have been suggesting to hold between heads, relative nouns and complementizers of relative clauses. The ungrammatical (134b) would thus have the structure (141):

(141)



The spot is marked with an X where the Complementizer-Head Connection crosses the coordinate structure boundary.

The reader will note the presence of one assumption that is from the point of view of the Navajo quite gratuitous: I have assumed that the Navajo extraposed relative is

introduced by a rule $S \rightarrow S \bar{S}$. The purpose of this assumption is to create a structural parallelism between the English and the Navajo extraposed relatives.

There are two considerations that motivate introducing extraposed relatives in English with $S \rightarrow S \bar{S}$ rather than with any of the other alternatives one might imagine. First the construction can stack:

- (142) a woman came in who I knew who had taught at
Berkely

Second, consider what happens when we attach an extraposed relative to a complement sentence:

- (143) it is obvious that a man came in and (*that) a
woman went out who were similar.

By introducing the relative clause as an expansion of S rather than of \bar{S} we explain why the conjunction that cannot be repeated on the second conjunct. I believe that when the sense of the relative clause is such that a derivation by Right Node Raising from multiple relative clauses in a coordinate structure is possible, then the conjunction may be repeated:

- (144) it is obvious that a man came in and that a woman
went out who were wearing boots

Why should the English and the Navajo structures be assimilated? They both appear to be in some sense 'variants' of an embedded relative clause structure. In this feature they are distinguished from the trailing relative clauses of the Australian and Indic languages we have observed above. They have in addition the property of not corresponding

to any anticipatory relative clause structure.

Next, we observed in section 1.1.2.1. that extraposed relatives in Navajo obligatorily underwent a rule deleting NP_{rel} . In English, similarly, the NP_{rel} of an extraposed relative clause must be a relative pronoun or it must be deleted (assuming with (Bresnan 1970) that English that-relative clauses suffer deletion of NP_{rel}). In contradistinction we see that in the trailing relative clauses of the previous subsections NP_{rel} could be repeated. I hypothesize that obligatory deletion or pronominalization of NP_{rel} is a restriction which may be imposed on relative clauses introduced by rules of the form $X \rightarrow X \bar{S}$ or $X \rightarrow \bar{S} X$ (where X is any category) but not on relative clauses introduced by other sorts of rules, such as $\bar{S} \rightarrow COMP (\bar{S}) S (\bar{S})$ or $CP \rightarrow NP (\bar{S}) CASE$. We are thus led to predict that nonrestrictive relatives in English can have full NP heads, which is indeed the case:

- (145) my dog, which faithful animal has guarded me
for years, is waiting outside your door.

We might further ask why it seems to be that anticipatory relatives never seem to require pronominalization or deletion of NP_{rel} : under the present approach we may propose that it is because there is no rule of the form $S \rightarrow \bar{S} S$ in any language. Of course this fact itself requires explanation.

I finally observe that adjoined, but not extraposed relative clauses may have multiple wh words. Hence *a man came in and a woman went out who loved who is bad in English, and there is no Navajo sentence for "*a dog was chasing a cat which bit which." Perhaps this fact is related to the pronominalization requirement noted above.

I therefore propose that there is a type of relative clause, the extraposed relative, which is essentially a variant of the embedded relative and is quite different from the trailing relative. Extraposed relatives are introduced by the rule $S \rightarrow S \bar{S}$. That the Navajo extraposed relative is introduced by this rule is at present more of a prediction than a fact.

1.1.3.7. Remarks on Multiple Headedness: We may observe that the multiple headed clauses we have seen fall into two types: those where a single NP_{rel} has multiple antecedents, and cases where a single relative clause has multiple NP_{rel} , each with its own antecedent. This latter case I hypothesize to be impossible with relative clauses introduced by rules of the form $X \rightarrow X \bar{S}$ and $X \rightarrow \bar{S} X$.

We are thus led to suspect that multiple wh words may be possible with nonrestrictive relatives in English. The following, suggested by Bill Cantrall, is as good as they come:

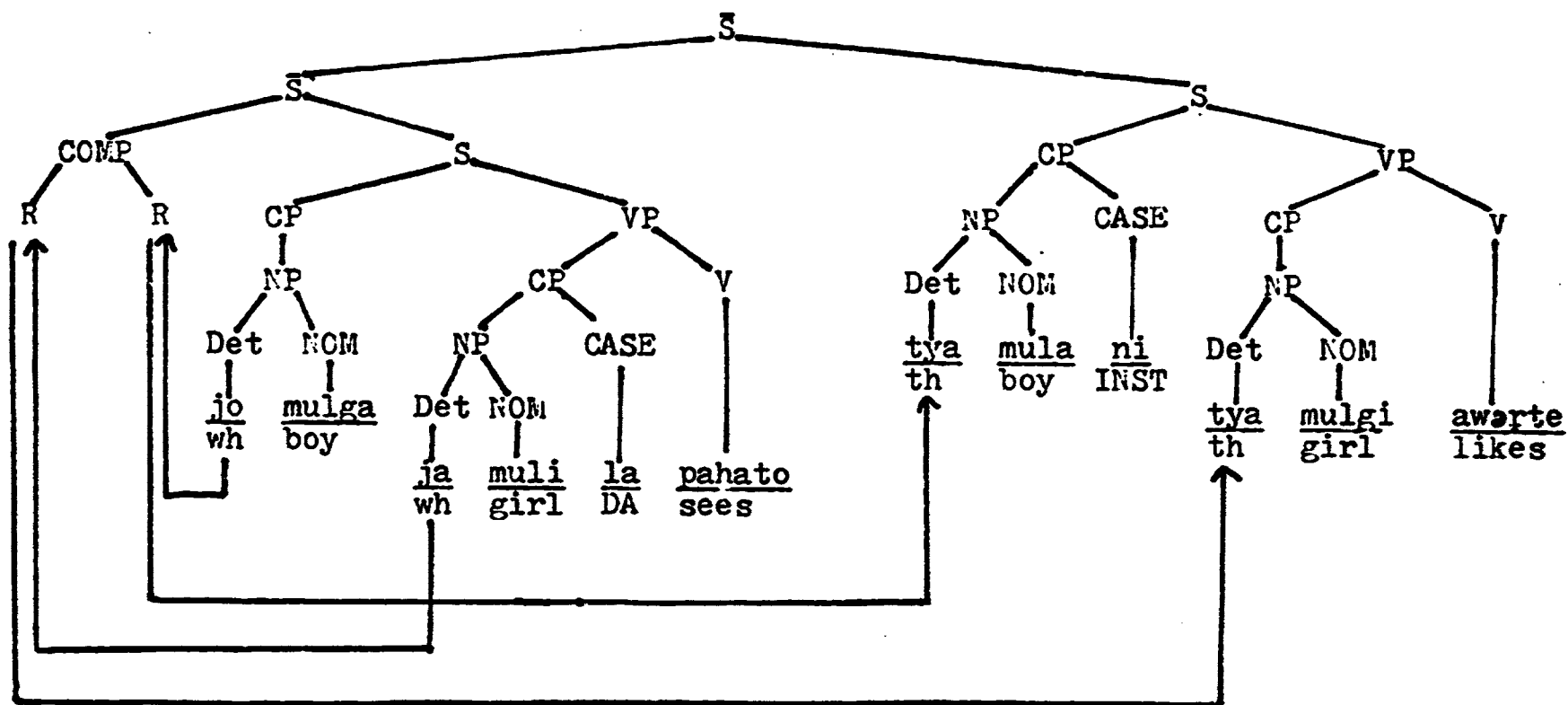
(146) ??I scribbled on the cover of a book, which cover
of which book was orange.

All examples that I can construct are rather dubious, but often less so than one might expect. Note that (146), unlike the

relatives of 1.1.3.6., requires a comma pause before the relative clause, making it a sort of nonrestrictive.

Finally, the existence of multiple headed clauses necessitates complications in the abstract relations I have proposed to be involved in relative clauses. In chapter 2 I will cast a proposal in more rigorous terms, but here I will describe a scheme that lets us stick to the graphic representation we have been using without too much difficulty. Let us say that COMP of a relative clause expands into an n -tuple R^n . Each R may then be connected by arrows to a single NP_{rel} and to a nonnull set of NP_{hd} . In all English R^n , we have $n=1$ (with the dubious exception of such examples as (146)), but in Marathi we may have $n=2, 3$, etc. Sentence (107a) will thus receive the following representation (147) on the following page. This expansion of COMP into an n -tuple will offend most readers, and when we move to a more abstract form of representation we shall eliminate it.

Before closing section 1.1., I would like to mention one final fact. It appears that in all cases, the heads of a relative clause are in construction with that clause. We may easily accomodate this with a principle restricting configurations of trees-cum-abstract relations. Such a principle, along with many others, will be given in chapter 2.



For the unique pair (x, y) where x is a boy, y is a girl and
x sees y, x likes y.

1.2. The treatment of NP_{rel}: In this section I shall discuss the various things things that happen to NP_{rel}. I shall first in 1.2.1. discuss languages in which NP_{rel} bear a special morphological mark, but is not deleted by a special process or moved to the front of the clause. In one of these languages NP_{rel} is replaced by a special pronoun, and in the other a special agreement marker is placed on the verb which may be regarded as a copy of a specially marked pronoun that subsequently deletes by ordinary pronominalization processes. In 1.2.2. I will discuss some languages in which NP_{rel} is simply deleted, and in 1.2.3. I will discuss the preposing of NP_{rel} to the front of the relative clause. Finally in 1.2.4. I will give some general discussion of constraints on the form and position of NP_{rel}.

1.2.1. Languages marking NP_{rel}: I will here discuss two languages with marking but not preposing of NP_{rel}: Crow and Swahili. Crow is a surfacely transparent case of the phenomenon inasmuch as in the construction we shall discuss there is a special pronoun that takes the place of NP_{rel}. We require an analysis to arrive at the conclusion that Swahili has marking without movement of NP_{rel}.

1.2.1.1. Crow: Crow is A Siouan language with about (very roughly) 4,000 speakers, spoken in southeastern Montana. It is an SOV language with postpositions and following conjunctions and complementizers, and considerable

scrambling. The person and number of subjects, objects and possessors are extensively marked on verbs, postpositions and possessed NP. A particularly interesting feature of the language is a rich array of determiners on NP which are homophonous with and semantically similar and often identical to "complementizers" that appear on verbs. The orthography used is that adopted by the Crow Bilingual Education Project. Dale Oldhorn, George Reed and Rose Chesarek have been especially helpful in providing me with information about Crow, although many other members of the Crow Tribe have been of assistance.

Crow has at least four relative clause constructions, an internal head relative, an anticipatory relative, a post-relative and a free relative. My knowledge of the language is too small to allow me to say much insightful about most of these. I will therefore make some points which are of general interest with the post-relative structure, then briefly describe the others.

In the postrelative construction the head NP takes the determiner -m and the relative clause takes the termination e:s, which serves as an anaphoric definite article on NP, and is attached to clauses representing old, "presupposed" information. NP_{rel} is represented by the word ak, which functions only as a subject. We thus attain the NP (148):

- (148) shiká:ka-m ak bi:-lich-é:sh
 boy-SPEC who me-hit-DEF
 "the boy who hit me"

I gloss m as SPEC because it generally makes NP specific. So shiká:ke aw-áka:-ssa:-k 'boy I-see-NEG-DECL', 'I didn't see any boy,' but shiká:kam awaká:ssa:k 'I didn't see a (specific) boy.' k is a formative that ends declarative clauses.

We may determine that ak is a syntactically motile word rather than merely an agentive nominalization prefix by observing that it may occur freely with a relative clause containing several major constituents:

- (149) a. shiká:ka-m ak hú:le:sh Bill-sh dich-é:sh
 boy-SPEC who yesterday Bill-NM hit-DEF
 b. shiká:kam hú:le:sh ak Billsh diché:sh
 c. shiká:kam hú:le:sh Billsh ak diché:sh
 "the boy who hit Bill yesterday"

The sh formative that I gloss NM is, I believe, a form of the definite article that is attached to proper names.

ak may appear within a subordinate clause in the relative clause. Hence we get (150):

- (150) shiká:ka-m Bill-sh ak hu:-wíá:-k hiliá:ch-e:sh
 boy-SPEC Bill-NM who come-will-DECL think-DEF
 "the boy who Bill thinks will come"

There is a constraint on English that if a relative clause has a subject and a complement clause containing NP coreferential to the subject, then the subject can be NP_{rel}, but none of the NP in the complement clause may. This phenomenon along with others is subsumed under

the Crossover Principles of (Postal 1971, 1972). Hence we have the data of (151):

- (151) a. the boy who_i thought he_i was smart
 b. the boy who_i he_j thought was smart
 c. *the boy who_i he_i thought was smart

Postal (1971) proposed accounting for this with a constraint on movement: the movement of the pronoun who in (151c) over the coreferential pronoun he was to block the sentence. In the (1972) paper he suggested retreating from this position. The data from Crow show that this retreat was well-advised, inasmuch as this relative clause construction obeys the constraint even though NP_{rel} is not moved at all, but merely assumes a special form. If we intercalate ak between an NP that its appropriate as an object of the complement verb and the complement verb, we prevent it from being analysed as a constituent of the topmost S in the relative clause. Then we get the following:

- (152) a. shiká:ka-m ak ú:xa-m dappeé-k hilí:ch-e:sh
 boy-SPEC who deer-SPEC kill-DECL think-DEF
 "the boy who thinks he killed a deer"
 b. shiká:ka-m ú:xa-m ak dappeé-k hilí:ch-e:sh
 boy-SPEC deer-SPEC who kill-DECL think-DEF
 "the boy who_i he_j thinks killed a deer"
 *"the boy who_i thinks he_i killed a deer"

I shall now briefly run through the other constructions. In the internal head relative clause, NP_{rel} ends in -m or nothing, and the complementizer may be at least e:sh

or nothing, and possibly others, such as m, as well.

We have for example (153):

- (153) a. Mary-sh shiká:ka-m hi:-lich-é:sh
 Mary-NM boy-SPEC meet-sort of-DEF
 "the boy who Mary is dating"
- b. Mary-sh shiká:ke hi:-lich-é:sh
 Mary-NM boy meet-sort of-DEF
 "the boy who Mary is dating"

NP_{rel} may occupy many positions within the relative clause -- subject, object, possessor, etc., and it may be in many kinds of subordinate clauses, such as conditionals and indirect questions. This construction thus makes up for the restricted nature of the ak postrelative.

There appears to be an anticipatory relative in which a clause ending in e:sh preceeds the matrix. The NP_{rel} take m and the NP_{hd} take the demonstrative koo. I consider the analysis of this structure as a real relative clause highly speculative:

- (154) shiká:ka-m bú:bchi-m bí:ka:ta-m kush-shí:ch-e:sh
 boy-SPEC ball-SPEC girl-SPEC to-throw-DEF
 koo shiká:ke koo bú:bche koo bí:ka:te
 DEM boy DEM DEM girl
 ak-dichi-k
 with-hit-DECL
 "ya know the boy who threw the ball at the girl?
 well, he hit her with it"

There are finally the free relatives. These occur in four varieties. When relativizing on the subject, one uses ak. When relativizing on objects, one uses the pronoun ba:(m) 'something' to replace NP_{rel}. Adverbial clauses of place, time and manner are formed with ala

replacing NP_{rel}. These three constructions are illustrated in the following:

- (155) a. Bill-sh ak dapp-é:sh sahí:-k
 Bill-NM who kill-DEF Cree-DECL
 "the one who killed Bill was a Cree"
- b. ba: aw-áke xawí:-k
 something I-see bad-DECL
 "what I saw was bad"
- c. u:xa-m an-dá:-ppe , al u:xam dá:ppe
 deer-SPEC ADV-you-kill
 "the time, manner or place in which you killed a deer"

The final construction is that used when NP_{rel} is an instrumental. Crow treats instrumental NP in a very special way: between the instrumental NP and the verb occurs a formative i: which may come anywhere between major constituent breaks. Hence we get the following:

- (156) a. bas-í:la:le i: b-ilápxe chichúche
 my-car INST my-father Hardin
 kuss-a:wa:lé:-k
 to I:take-DECL
 "I took my father to Hardin in my car"
- b. basí:la:le bilápxe i: chichúche kussa:wa:lé:k
- c. basí:la:le bilápxe chichúche i:kussa:wa:lé:k

Of these variants, (a) and (c) are the best. To get a relative clause on an instrumental one merely takes the clause keeping i: and omitting NP_{rel}, supplying the appropriate complementizer (most often null) to the verb. Hence one gets i: lía:-we 'with do-I', 'what I did it with.' It is worth mentioning that free relative clauses are a very productive source of common noun

from the relative clause of (157a) comes the noun
amma:ia:schilua: 'store,' and from that of (157b) comes
i:wa:wara:tua: 'pencil':

- (157) a. am-ma:-ía:schil-ua:
 ADV-something-buy-Pl
 "where one buys things"
- b. i:-wa:-wara:t-úa:
 INST-something-write-Pl
 "what one writes with"

The Pl is an agreement marker for a third person plural subject that is deleted, which expresses indefinite agency. Hence we have dit-ú:-k (hit-Pl-DECL) "they killed him (with the indefinite agent use of 'they')." We can spot the nouns because they, unlike relative clauses, can pluralize. Hence we have amma:ia:schiluo 'stores,' i:wa:wara:túo 'pencils.'

I am reasonably sure that the construction with ba: cannot be used with a head. The evidence with ala is rather contradictory. Although Crows seem to overwhelmingly reject examples that I concoct with ala in a postrelative structure, they will occasionally let one by. I have found no way to tell whether the instrumental construction appears in a postrelative structure, for the reason that a sequence such as 'pencil letter i:-I wrote' could be analysed either as a postrelative or an internal head relative.

In Crow we thus find a clear case of replacement of NP_{rel} by a special pronoun, and a variety of further

structures which demand more thorough investigation.

1.2.1.2. Swahili: The Swahili construction may be regarded as a variation on the Crow. Unlike the Crow ak construction, NP_{rel} may occupy almost any grammatical position. Also unlike Crow, NP_{rel} gets deleted, presumably by the ordinary pronoun dropping rules. But the special mark on NP_{rel} leaves a trace in the form of a special agreement marking on the verb.

I shall give much more background information about Swahili than about the other languages in this study, since with this information we can solve an interesting problem.

1.2.1.2.1. NP: Swahili has an intricate noun-class system. For each class there are two characteristic prefixes (one or both of them sometimes null), a singular and a plural, which are attached to all occurrences of the noun itself. Hence we have m-tu, wa-tu 'man, men'; ki-tabu, vi-tabu, 'book, books'; yai, ma-yai 'egg, eggs.' Furthermore, corresponding to each number/class prefix there is a 'concord' which is added to words bearing various syntactic relations to the NP, and thus causes them to agree with it. Verbs take a concord which indicates the class/number of their subject: m-tu a-tatosha, wa-tu wa-tatosha 'the man will be sufficient, the men will be sufficient'; ki-tabu ki-tatosha, vi-tabu vi-tatosha 'the book will be sufficient, the books will be sufficient';

yai li-tatosha, ma-yai ya-tatosha 'the egg will be sufficient, the eggs will be sufficient.' Concords are also added to adjectives modifying nouns, both predicate and attributive.

For animate beings there is a set of personal pronouns, 1st, 2nd and 3rd persons, singular and plural. The first and second persons function like special noun-classes, having their own concord affixes, while the 3rd person uses the concord for animates (the m-tu - wa-tu class). One has hence mimi ni-takufa 'I will die'; yeye a-takufa 'he will die.' Since most pronouns have some concord prefix referencing them, the pronouns are freely deleteable when nonemphatic. For inanimates there are no surface pronouns at all: one must make do with concord prefixes, demonstratives and NP such as kitu 'thing.'

There are some demonstratives which can be used either as determiners or as independent pronouns. The demonstratives are built from a stem -le or h- with a concord which is usually similar to that used on verbs to agree with the subject. For the -le demonstrative, which means 'that, yonder,' one merely prefixes the appropriate concord: m-tu yu-le 'that man,' ma-yai ya-le 'those eggs.' The h- demonstrative is built by first suffixing to h- the vowel of the concord, and then the whole concord itself: m-tu h-u-yu 'this man,' wa-tu h-a-wa 'these men,' ki-tabu h-i-ki 'this book,' yai h-i-li 'this egg,' ma-yai h-a-ya 'these eggs.' Another demonstrative, supposedly used only to refer to things

which have already been mentioned, is formed by suffixing an o to the end of the h- demonstrative. The o causes phonological changes leading to such things as mtu huyo, watu hao, kitabu hicho, etc.

One of the most interesting grammatical categories in Swahili is the locative. Swahili locatives are characteristically used to express adverbial thematic relations such as place and time, but they can also be used as surface and even underlying subjects. One locative is the noun mahali 'place.' This takes its own special concord pa, and one hence gets such sentences as mahali pa-le pa-meharibika 'that place has been spoiled.'

More interesting locatives are made from nouns by suffixing -ni. One hence has mji-ni 'in the town,' nyumba-ni 'in the house,' mlango-ni 'at the door.' The locatives behave syntactically like NP. Although the locatives themselves lack any class-prefix other than that of the NP they are built from, the concords on the elements agreeing with them show that they fall into three classes, depending on the kind of locative relation they express. The concords are m(u) 'within,' pa 'at' and ku 'around, along' (meanings grossly oversimplified). Demonstratives are built from the locative concords, and one has thus such expressions as m-le (sanduku-ni) 'in there (in the box),' h-a-pa mlango-ni 'there at the door,' and so forth.

In locative expressions with definite subjects ('the animals are in the forest') the verb to be (usually phonologically null) is used with the subject concord of the subject preceding the verb, and the locative concord of the locative following the verb, followed by the o which was mentioned above. One has hence ki-su k-ko (<ku-o) nymbani 'the knife is in the house,' kisu ki-po (<pa-o) mezani 'the knife is on the table,' and kisu ki-mo (<mu-o) sanduku-ni 'the knife is in the box.'

There are two prepositions, kwa and na, which frequently have their objects copied onto them in the form of the concord+o combination we have seen several times before. For brevity I will refer to this combination of concord+o as a kihusiano (pl. vihusiano), a term invented by a native grammarian. For each noun-class and number (including the locatives) there is a class-prefix (frequently null), concord affixes and a kihusiano. For one class, the m-tu class (singular animate) the kihusiano is irregular, being ye, which, interestingly enough, turns out to be the stem from which the third person singular personal pronoun yeye is formed. Hence we frequently copy vihusiano onto kwa and na, getting such forms as naye 'with him.' For 1st and 2nd person pronouns, the base from which the pronoun is formed by reduplication is copied onto na. Hence one has mimi, nami 'me, with me.' In the third

person plural the pronoun is wao, and the *kihusiano* is o, a contraction of wao.

The preposition na is primarily comitative and instrumental; hence nacho 'with it (say, a book),' nayo 'with them (eggs).' kwa is generally agentive and instrumental; kwao 'by them (people).'

There is thus a rule copying underlying pronouns onto these prepositions in the form of a *kihusiano*. When the object of the preposition is a full NP, the copying generally does not occur: hence na fimbo 'with a stick.' The copying rule assures that na and kwa are never left stranded without any expression of their object, since precisely the things that get deleted freely, nonemphatic pronouns, get copied obligatorily.

1.2.1.2.2. Non-Relative Verbs: The Swahili verb is composed by adding prefixes and suffixes to the stem. The suffixes express for the most part categories of voice which are not my concern in this paper. The prefixes may be regarded as clitics which have become one word with the stem. They fit into the following five slots:

(158) Pre-Verbal Clitic Slots:

| I | II | III | IV | V |
|-------------------------|--------------------|--------------------------------------|------------------------------|-------------------|
| <u>ha</u> (negation) | subject concord | tense/ aspect, <u>si</u> (neg) | relative <i>kihusiano</i> | object concord |

In this subsection I will discuss slots I, II, III and V, leaving IV for the discussion of relativization. Slots II and V are well behaved, their contents varying

independently of each other (excepting some twitches caused by relativization). I, III and IV have mutual interdependencies. The prefix ha- (in certain forms supplemented with the suffix -i) is used to make negatives. It is used only with certain tense-aspects, and never when there is a relative *kihusiano* present. ha is never followed by the subject concord ni 'I.' Instead the sequence ha-ni is suppletively replaced by si (distinct from the negative si of slot III).

The occupants of slot III are various. The negative si is used only with relative verbs (those where slot IV is filled); hence si and ha are mutually exclusive. Many of the tense-aspects either do not occur or are expressed by different formatives when I or IV are occupied.

The subject concords we have already seen in operation. They are obligatory, except with the infinitive (taking a ku in slot III) and a 'general' tense with a III-prefix hu. The absence of subject concords with ku is presumably a consequence of the subjects having been deleted, but the absence with hu is unexplained. In Swahili, as in many languages (see Kuno 1971), the locative in a sentence with an indefinite underlying subject becomes the subject, expelling the original subject to a position after the verb. The advancement of locative to subject manifests itself in Swahili with unusual clarity because in such sentences the subject slot takes the locative concord

appropriate to the locative notion intended, and the locative appears in front of the verb in characteristic subject position. This is true even when the locative is a prepositional phrase in such prepositions as katika 'in.'

Thus we have examples such as the following of (159). To keep the interlinear glosses manageable I adopt the following abbreviations: SG, singular class prefix; PL, plural class prefix; SB, subject concord; OB object concord; REL, relative *kihusiano*.

- (159) a. mwitu-ni m-me-lala wa-nyama
forest-LOC SB-PERF-sleep PL-animal
"In the forest sleep animals."
- b. wanyama wamelala mwituni
animals SB:PERF:sleep in the forest
"The animals sleep in the forest."
- c. ki-banda-ni m-me-lala wa-dudu
SG-shed-LOC SB-PERF-sleep PL-insect
"In the shed sleep insects."
- d. kule mji-ni ku-me-kufa wa-tu
there town-LOC SB-PERF-die PL-person
"In the town over there people have died."
- e. hapa pa-me-kufa simba
here SB-PERF-die lion
"Here has died a lion."
- f. katika sanduku m-me-lala m-dudu
in box SB-PERF-sleep SG-insect
"In the box is sleeping an insect."

(with stative verbs such as lala 'sleep' the perfect aspect marker me is used to express the present). This gives us evidence that these locatives are all surface NP. In

particular, PP such as those with katika where there is evidence that the whole phrase is an NP may be contrasted with PP in kwa and na where there is no such evidence.

Unlike the subject prefix, the object prefix is optional. There appears to be a relation between humanness and copyability; human direct objects are most desirous of being copied, while inanimate objects are least. Nonetheless they all can be copied. Below are examples:

(160) a. ni-li-mw-ona (mtoto)
I-PAST-him-saw (child)
"I saw him (the child)."

b. ni-li-ki-ona ki-tabu
I-PAST-CB-saw SG-book
"I saw the book."

Swahili has an almost always obligatory Dative-movement rule which takes indirect objects (which occasionally appear unmoved as prepositional phrases with the preposition kwa) and places them directly in front of the direct object and after the main verb. Hence the moved indirect object acquires the syntactic position of a direct object. At the same time the verb gets its object concord from the moved indirect object rather than from the direct object;

(161) a. ni-li-m-pe m-toto ki-tabu
I-PAST-him-bive SG-child SG-book
"I gave the child the book."

b. *nilikipe kitabu mtoto
(O.K. with the nonsensical reading 'I gave the child to the book.')

c. *nilikipe mtoto kitabu

This shows that the verb is agreeing with the first NP in the VP.

We have seen that there are rules copying subject and object clitic forms onto the verb. David Perlmutter has observed that when clitics are formed and moved, there are only two places they can go: to the verb, as they do in Swahili, or to second position in the sentence, as they do in Walbiri (of course, this applies only to clitics formed from major constituents of the sentence: clitics formed within an NP, such as copies of the possessor of that NP, will move the head N, and likewise in PP). This suggests that a grammatical description of clitics in a language will consist of two components: one which says where, when formed, they will go. The other component describes the conditions under which they are formed in the first place. In Swahili the grammar will contain a statement to the effect that clitics go to the verb, and it will furthermore contain the two statements that subject clitics are generated obligatorily and that object clitics are generated optionally. The movement statement will then cause them to be swept to the verb. Once they get there, they will be ordered by a Surface Structure Constraint in the manner of Perlmutter (1971).

1.2.1.2.3. Relative Verbs: Swahili relative clauses fall into two classes: those with a relative *kihusiano* in slot IV of the verb of S_{rel} , and those with the *kihusiano* attached to a particle amba appearing at the front of the clause. Since the restrictions on the former construction reveal the nature of the latter and the reasons for its existence, I shall discuss it first.

When a relative *kihusiano* appears in slot IV, the number of possible tense-aspect distinctions becomes greatly reduced. If the verb is negative, negation must be expressed by a prefix si appearing in slot III, the tense-aspect slot, and all tense-aspect distinctions become neutralized. There is also a generic relative, in which slot III is empty and slot IV hops around to the end of the verb, slots II and V remaining in their old positions, and there are in addition progressive (na) past (li) and future (taka) tenses, to the exclusion of all others.

The question now arises: what fills slot IV and how does it get there? Slot IV is filled with the *kihusiano* of NP_{rel} . However in order for the *kihusiano* to get there and hence for a relative verb to be possible, NP_{rel} must bear an appropriate syntactic relations to S_{rel} .

I will examine what happens when NP_{rel} bears various syntactic relations to S_{rel} . When NP_{rel} is the subject, both the relative *kihusiano* and the subject

concord appear on the verb. We have therefore examples such as the following:

- (162) a. m-tu a-li-ye-ki-soma ki-tabu hiki
 SG-man SB-PAST-REI-OB-read SG-book this
 "a man who read this book"
- b. m-tu a-si-ye-soma
 SG-man SB-NEG-REL-read
 "a man who does not read"
- c. mimi n-a-sema ni-taka-ye-kuwa
 I SB-FRES-say SB-FUT-REL-be
 Sultani wenu
 Sultan your
 "I say it, who will be your Sultan."

From these examples we can discern various things about the rule generating relative vihusiano. First of all, it is a rule distinct from the one generating subject concords. In these examples both rules apply. Secondly, all the rule has to do is specify that a relative vihuiano is created. I propose that this creation itself proceeds in two steps. First there is a specification that NP_{rel} is specially marked, and then there is a specification that it produces a clitic. The creation of the relative clitic is quite independent of the creation of the subject clitic, and subsequent to these processes pronoun deletion disposes of NP_{rel} . The vihusiano, as well as all the other clitics, actually get to the verb by a rule which merely moves clitics to the verb. This rule appears to apply at various stages of the derivation: for example after subject clitic formation and also after kihuisiano formation. Note from

(162c) that even when NP_{rel} is first person one gets the 3rd person kihusiano. I don't know why this is the case.

If NP_{rel} is object, its kihusiano also appears on the verb, and the object concord may or may not appear:

- (163) a. mtu u-na-ye-m-saidia
man you-PROG-REL-him-assist
"the person you are assisting"
- b. ki-tabu a-ki-taka-cho Hamisi
SG-book he-OB-want-REL Hamisi
"the book which Hamisi wants"
- c. kitabu atakacho Hamisi
"the book which Hamisi wants"

These sentences illustrate another rule which has the effect of moving the relative verb to the front of the relative clause, instead of leaving it behind the subject where it normally would appear in a main clause.

If NP_{rel} is the direct object of a verb that has an indirect object in the construction where the indirect object is a naked NP preceding the direct object, then its kihusiano still appears on the verb, even though an object concord for NP_{rel} is in this case quite impossible:

- (164) barua ni-taka-yo-mw-andikia
letter I-FUT-REL-him-write
"the letter which I shall write to him"

This last example illustrates quite clearly the independence of relative kihusiano creation from subject and object concord creation.

Relative vihusiano are found attached to the verb with two further types of NP_{rel}: NP_{rel} which are objects of the prepositions kwa and na (kwa rather rarely), and NP_{rel} which are adverbial modifiers of place, time and manner. Examples of these phenomena are given below:

- (165) a. ma-embe ni-li-yo-kuwa na-yo
 PL-mango I-PAST-REL-be with-them
 "the mangoes which I was with," meaning
 "the mangoes which I had"
- b. fimbo u-li-yo-pig-wa na-yo
 stick you-PAST-REL-hit-PASSIVE with-it
 "the stick that you were hit with"
- c. rafiki ni-li-o-sema na-o
 friends I-PAST-REL-talk with-them
 "my friends who I was talking with"
- d. a-ta-weze ku-salimika na ile ibu
 he-FUT-be able INF-escape from the stigma
 wa-li-yo-m-tia chapa kwa-yo
 they-PAST-REL-him-put brand with-it
 wa-zee wake
 PL-elder his
 "Will he be able to escape the stigma with
 which his parents have branded him?"

While NP_{rel} is alocative in S_{rel}, NP_{nd} may function either as a subject or object or an adverbial in the main clause:

- (166) a. tu-me-pa-ona a-li-po-pigana
 we-PERF-OB-see there he-PAST-REL-fight
 (loc)
 na simba
 with lion
 "We have seen the spot where he fought with
 the lion."
- b. hamna kitanda chumba-ni a-na-mo-lala
 there is not bed room-LOC he-PROG-REL-sleep

"There is not a bed in the room in which he is sleeping."

When NP_{rel} is temporal, locative vihusiano, notably po, are used. When it is a manner adverbial, the special kihusiano vyo is used:

- (167) a. a-li-po-sema, watu wakakimbia
he-PAST-REL-say people fled
(temp)

"When he spoke, the people all fled."

- b. i-li-tuka jinsi u-li-vyo-eleza
SB-PAST-happen manner you-FAST-REL-explain
(manner)

"It happened in the manner that you have explained."

We can observe that all of the usages of the relative verb have it in common that NP_{rel} is dominated by S_{rel} without there being an NF dominating NP_{rel} and dominated by S_{rel}. In fact, if NP_{rel} is the object of the complement of a verb, the possessor of something, or the object of a substantial preposition such as katika 'in' (remember that katika phrases show agreement evidence of being NP), the relative verb cannot be used. Relative marking in Swahili thus appears to obey the original A-over-A constraint.

In order to express a relative clause in which NP_{rel} is buried inside another NP it is necessary to use the amba-construction, which I discuss in the next section. Note that this account of the constraint depends crucially on kwa and na phrases not being NP at the time NP_{rel} applies (presumably deep structure).

- d. walifika katika bustani amba-yo
 they arrived in garden amba-yo
 ndani yake mna ma-ua ya kila
 interior its were in PL-flower of every
 rangi
 color
 "They came to a garden in which were flowers
 of every color."
- e. ile nyumba amba-yo paa lake li-me-ungua
 the house amba-REL roof its SB-PERF-scorched
 "the house, the roof of which was scorched"
- f. yule jumbe amba-ye tu-li-zugumza
 the messenger amba-REL we-PAST-converse
 habari zake
 news his
 "the messenger about whom we were conversing"

It is clear from the above examples that NP_{rel} in the clause following amba is being treated exactly as an ordinary pronoun. The question then is how does amba preserve NP_{rel} from marking, and why does it allow NP_{rel} to appear within NP and complement S?

The amba construction is rather new: until around the turn of the century structures that one must use amba to relativize were unrelativizable in Swahili. Furthermore amba is the stem of a verb meaning 'to speak.' Although amba alone has dropped out of usage, one of its voice-derivatives, ambia 'to speak to' is still widely used. D. Perlmutter tells me that in languages where there are strong restrictions on what may be relativized, a very common way of evading these restrictions is to say such things as 'the book of which I saw that Mary believes John wrote it.' Note that in this

sentence NP_{rel} is in the topmost clause, and it has a coreferent embedded inside a believe-clause, which in a language like Swahili would be an impossible context to relativize out of directly. I therefore propose that amba is in fact a highly defective, semantically empty verb which takes two arguments: NP_{rel}, and the S which expresses the content of the relative clause. This would allow us to keep a simple restriction on NP_{rel} marking in Swahili, with the amba construction being a frozen form of a construction designed to evade the effects of the constraint. I believe that this hypothesis is attractive, and its further verification should prove an interesting task.

There are two further sets of facts which the hypothesis must come to grips with, although I am not sure of their significance. First, there are sentences in which a relative *kihusiano* appears both on amba and on the verb:

- (169) a. mimi amba-ye ni-taka-ye watoto
 I amba-REL I-want-REL children
 si-wa-pata
 NEG:I-them-receive

"I who want children do not get them."

- b. mahali amba-po i-li-po-fungiliwa
 place amba-REL SB-PAST-REL-be unfurled
 bandera ya Kiingereza
 flag of England

"a place where the British flag had been unfurled"

I suspect that this may have something to do with the 'double relativization' in English that we find in such

sentences as "The man who they tortured by burning holes in with cigarettes was not pleased." For some reason both NP_{rel} and its coreferent in the complement of amba acquire the NP_{rel} mark, and both are treated as usual by the cliticization rule applying to NP bearing this mark.

Secondly, there are certain dialects in which not only does amba get the *kihusiano* of NP_{rel} suffixed to it, but it also gets the subject concord of NP_{rel} prefixed to it, just as if NP_{rel} were its near-surface subject. Hence in the KiVumba dialect of the southern Kenya coast (East African Swahili Committee, 1956-1958) we have sentences such as the following:

- (170) a. jambo l-amba-lo l-a-ni-dhuru ndi-lo
 thing SB-amba-REL SB-PRES-me-hurts is-it
 hili
 this

"The thing that hurts me is this."

- b. wewe w-amba-e ku-na-n-amba ni mwivi
 you SB-amba-REL you-PERF-me-say I thief
 mbona k'-u-vi-ono vy-amba-vyo
 why you-NEG-them-see SB-amba-REL
 si-kw-achii
 I-you-left

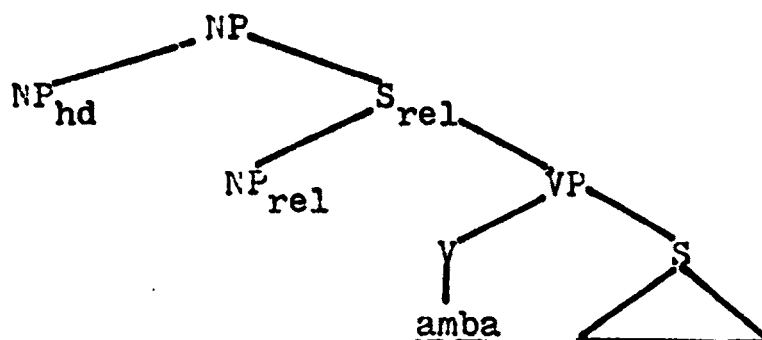
"You who accuse me of being a thief, why did you not notice the things I left for you?"

A final fact is that in this dialect, as well as in the standard language, the amba may be followed by kwamba, a complementizer frequently used to introduce indirect discourse. Hence we have these examples:

- (171) a. ni-me-sikia kwamba mwitu u-ki-washwa
 I-PERF-heard that forest SB-if-is put to
 moto, u-ta-ungua wote
 fire SB-FUT-burn all
 "I have heard that if fire is put to
 the forest it will burn away completely."
- b. watu amba-o kwamba wa tayari
 people amba-REL that SB ready
 "people who are ready"

These examples suggest that the surface structure of the amba-relative is roughly like (172):

(172)



The apparent peculiarities of the amba-relative clauses may thus have a reasonable explanation, with the complexities in NP_{rel} marking being consequences of its interaction with other constructions. This concludes my discussion of Swahili.

1.2.1.3. General Remarks on NP_{rel} Marking: We may observe that there is also NP_{rel} marking not associated with movement in the Indic languages discussed earlier: Sanskrit, Hindi and Marathi, as well as in Kabuiag. Although relative pronouns often wind up at the front of the sentence in the Indic languages, their propensity for scrambling makes it difficult to tell whether NP_{rel} is scrambled to the front, or gets there

by a special optional rule.

What is the mechanism for NP_{rel} marking? We could have the markers be generated in the base, or transformationally. There is little solid ground to determine the choice. In section 2.3. I will describe a proposal for performing the marking in the base.

One will observe that the vast majority of languages that have marking of NP_{rel} in an embedded relative construction have it in a post-relative structure. I know of only two languages that have it in pre-relatives, the closely related Northwest Caucasian languages Abkhaz and Abaza. In these languages NP_{rel} is deleted by ordinary pronominalization processes, but regular rules which put agreement markers on constituents to which the NP bears certain grammatical relations (subject, object, possessor, etc.) put the markers in a special form when the NP is NP_{rel}. These phenomena are described in (Anderson, in preparation).

We may finally observe that the paucal relative of English (section 1.1.2.2.) provides an example of NP_{rel} marking in an internal head relative clause. We thus see that NP_{rel} may be marked in all the varieties of relative clause structure that we have discerned.

1.2.2. Deletion of NP_{rel}: In many languages NP_{rel} merely disappears. There is a fundamental question of mechanism to which we have no answer: does the disappearance

come about by a bona fide deletion transformation, or is there instead generation of a phonologically null element in the deep structure position of NP_{rel}. Lacking an answer to this question, I shall speak of NP_{rel} Deletion knowing that the term 'Deletion' is perhaps merely suggestive.

Perlmutter (1972) suggested a test for distinguishing languages with deletion of NP_{rel} from languages in which there was free deletion of anaphoric pronouns, including NP_{rel}. He proposed that the former, but not the latter languages obeyed island constraints. Recent work by Keenan (1972) calls this into doubt. Keenan observes that many languages in which NP_{rel} is represented by a pronoun rather than being deleted obey island-like constraints on where NP_{rel} may be found.

For these reason I will accept as true NP_{rel} Deletion languages only languages in which there are NP_{rel} that disappear that could not be removed by free pronoun deletion. I will consider two such languages: Turkish, where the deletion happens in a pre-relative clause, and Modern Greek, in which it takes place in a post-relative.

1.2.2.1. Turkish: In section 1.1.1.2.2. I said that Turkish had deletion of NP_{rel}, but I did not demonstrate it. This I now proceed to do.

In Turkish unstressed subject and possessor pronouns are regularly dropped. Hence one gets examples like (173):

- (173) a. gel-di
come-PAST
"He came."
- b. Hasan baba-s_ini gördü
Hasan father-his-ACC saw
"Hasan saw his father." (Hasan's or someone else's)
- c. Hasan Orhan-ın baba-s_ini gördü
Hasan Orhan-GEN father-his-ACC saw
"Hasan saw Orhan's father."

(173a) the subject pronoun has disappeared. In (173b) the genitive pronoun with which the agreement suffix -s_i is agreeing has vanished. In (173c) we see a sentence with full NP in the place of these missing ingredients.

Though subject and genitive pronouns vanish, object pronouns do not. Hence we have these sentences:

- (174) Hasan, Fatma-nın (*o-nu) öl-dür-eceğ-i-ni
Hasan Fatma-GEN (he-ACC) die-CAUSE-FUT-her-ACC
düşünüyor
thinks

"Hasan_i thinks that Fatma will kill him_i, j."

We see that the object pronoun of (174) is not freely deleteable. But when NP_{rel} is a direct object, it always disappears:

- (175) Orhan-ın (*o-nu) gör-düğ-ü adam çıktı
Orhan-GEN (he-ACC) see-NOM-his man left
"The man who Orhan saw left."

This deletion of the pronoun shows that there is in fact a rule of NP_{rel} deletion at work.

We can make an interesting contrast between Turkish

and English. Both English and Turkish have free relatives. The Turkish free relative looks exactly like a pre-relative, but has no head. Hence we have (176):

- (176) Hasan-ın al-dı^ı-ı-nı gördüm
 Hasan-GEN buy-NOM-his-ACC I saw
 "I saw what Hasan bought."

In English, however, we must form the free relative with a relative pronoun: we cannot use the that-relative or the contact relative construction. It would appear than that we would need two kinds of NP_{rel} deletion: one kind sensitive to the presence of a head, and the other kind not. There is, however, a possible escape from this conclusion.

We can paraphrase (176) with (177), which is identical in structure except that the relative clause is a pre-relative on the head NP sey 'thing':

- (177) Hasan'ın aldığı şeyi gördüm

We could claim that (176) was derived from (177) by a rule of sey-deletion. An immediate objection to this proposal is that one should not delete lexical items. This may be countered by proposing that sey is a 'pronominal N': a noun head that is really a pronoun, like 'place,' 'time,' and 'thing' in English. Since pronouns are members of a closed category, their deletion is not in principle as objectionable as deletion of real lexical items. See (Andrews 1974) for discussion.

I add as a cautionary note, however, that Navajo, which offers a free relative construction that cannot be analysed as a headed relative clause, does not need to have a rule of NP_{rel} deletion. This potential source of testimony as to whether there is NP_{rel} deletion in underlying headless relative clauses is not in fact available.

1.2.2.2. Modern Greek: Modern Greek has two relative clause constructions. One, characteristic of the literary (Katharevousa) language, has a relative pronoun o opíos (taking various inflectional forms) that is preposed to the front of the relative clause. o opíos is distinct from the interrogative pronoun píos 'who?' ti 'what?.' The other construction, characteristic of the colloquial (Demotic) language, has a relative complementizer pu. NP_{rel} is deleted or retained as a pronoun. I shall here investigate the properties of the pu-relative.

Modern Greek is an SVC language with scrambling, prepositions, preceding complementizers and conjunctions, and post-relative clauses. There are three cases on NP: nominative, genitive and accusative. Pronouns come in both clitic and nonclitic forms. Verbs are inflected for the person and number of their subjects, and there are no subject clitics, nonemphatic subjects being simply deleted. Nonemphatic direct and indirect objects appear as clitic pronouns on the verb, the direct object clitics being accusative, the indirect objects genitive. Full

NP indirect objects do not appear in the genitive, but rather as objects of the preposition se, of which we will have more to say in the sequel. In addition to case, nouns and their dependents are inflected for number (sg/pl) and gender (masc/fem/neut). These markings will not be noted in the glosses.

We can see from the following examples that ordinary anaphoric object pronoun clitics are not deleted freely:

- (178) a. o leonídhas vríke ton kósta
 the:NOM Leonidas:NOM found the:ACC Costa:ACC
 ke i maríka *(ton) skótose
 and the:NOM Maria:NOM him:ACC killed
 "Leonidas found Costa and Maria killed him."
- b. o leonídhas nomízi oti i
 the:NOM Leonidas:NOM thinks that the:NOM
 maríka tha *(ton) skotósi
 Maria:NOM FUT him:ACC kill
 "Leonidas thinks that Maria will kill him."

However an NP_{rel} object of a verb must be deleted:

- (179) o ándras pu (*ton) ídha íne
 the:NOM man:NOM REL him:ACC I saw is
 o leonídhas
 the:NOM Leonidas:NOM
 "The man who I saw is Leonidas."

Indirect object and possessive clitics on the other hand must be left behind in clitic form as 'returning pronouns':

- (180) a. i yinéka pu *(tis) édhsa to vivlío
 the woman REL she:GEN I gave the book
 "the woman who I gave the book to"

- b. i yinéka pu éklepsa to vivlío *(tis)
 the woman REL I stole the book she:GEN
 "the woman whose book I stole"

It is worth noting that in poetry accusative NP_{rel} may be left behind, as, for example, in the following two lines of Seferis:

- (181) páno s-to dzámi afto pu to xtipá i vroxi
 upon at-the window this REL it strikes the rain
 apo ton ékso kósmo
 from the outside world
 "upon this window struck by the rain/from the outside world" (Mythistorema 6, Keeley and Sherrard (1969)).

We may observe that it is the genitive clitics that are left behind, and the accusatives (and presumably the nominatives) that are deleted.

There is a constraint on relativization that NP_{rel} must either be deleted or appear as a clitic pronoun. Full NP or nonclitic pronominal NP are ungrammatical. This fact, together with some features of the system of prepositions, leads to there being an entertainingly unsayable class of sentences in Modern Greek. To exhibit them we must investigate the syntax of prepositional phrases.

There are two kinds of prepositions in Modern Greek. There are first the simple prepositions, which take accusative NP objects. Some of these are se 'to, at, on'; me 'with'; apo 'from'; ya 'for'; xorís, dhíxos 'without.'

The simple prepositions take their objects in the accusative case. Hence we have s-to trapézi 'on the table,' me tin kopéla 'with the girl,' apo to xorió 'from the village.' Nonclitic pronouns are treated exactly like ordinary NP: s' aftón 'to him.' But there is a constraint that the object cannot be a clitic: *ston, *stou, *me ton, *me tu, etc. Since se, me, and apo are clearly proclitics, we might explain the phenomenon by proposing a restriction that a clitic cannot take a clitic as head. But since the status of the other simple prepositions is not clear to me, I cannot rely on this explanation for the constraint.

There are then the adverbial prepositions, which are much more numerous than are the simple ones. These include mazí 'with,' kondá 'near,' and káto 'under.' They take as objects not NF, but prepositional phrases in the three simple prepositions se, me and apo ('at/to,' 'with' and 'from'). We hence find mazí me to korítsi 'with the girl,' kondá sto spiti 'near the house,' and káto apo to trapézi 'under the table,' mazí me aftín 'with her.' There is also a construction in which the adverbial prepositions take a clitic pronominal object. In the place of the simple prepositional phrase one merely puts a genitive clitic: mazí tis 'with her,' kondá tu 'near him,' káto tu 'under it, him.' It is thus the case that clitic objects can only appear with the adverbial prepositions. It is also worth noting that the adverbial prepositions, but not the simple, can 'predeterminer modification' as

described by (Bresnan 1973) and extended to English prepositional phrases by (Jackendoff 1973): pio pera apo ta vuna 'further beyond the mountains.' This fact as well as the cliticization phenomena suggest that the adverbial prepositions have a significant featural relationship to the major categories. There is no such evidence for the simple prepositions.

Now let us consider relativization. If NP_{rel} is the object of an adverbial preposition, NP_{rel} is represented by a genitive clitic on the preposition, and there is no problem:

- (182) i kopéla pu káthisa kondá tis
 the girl REL I sat near her:GEN
 "the girl I sat near"

If, however, NP_{rel} is the object of a simple preposition, the the pu construction simply can't be used:

- (183) *i kopéla pu mílisa me ({tin
 the girl REL I spoke with {aftir.})
 her

We are forced to use the relative pronoun o opíos:

- (184) i kopéla me tin opían mílisa
 the girl with whom I spoke
 "the girl with whom I spoke"

The morphologically sensitive reader will perhaps have noted that o opíos is of the form Definite Article + opíos, a form parallel in its make-up to Fr. lequelle, It. il quale and the archaic English the which. It is surely not accidental or a consequence of borrowing that so many relative pronouns are of this form.

On the basis of Modern Greek we make an observation that is of interest in the formalization of relativization rules. There are two morphological entities that may serve as NP_{rel}: a clitic pronoun, and the relative pronoun o opíos. The latter, but not the former, preposes. This shows that the rule is being conditioned not merely by the fact that a certain NP is NP_{rel}, but by the presence of an actual formative.

1.2.3. Movement of NP_{rel}: Movement of NP_{rel} is sufficiently familiar to need little discussion here. I wish, however, to make certain observations.

It is generally that the head of a relative clause is part of the environment for fronting in a relative clause. If English headless relatives are derived from underlyingly headless structures, then this position is untenable. Rather the conditioning factor would presumably be the 'R' that I propose to introduce relative clauses.

Recent work by Chomsky (1973) is compatible with this claim. Chomsky writes wh Movement as follows (Chomsky 1973 ex. 199b):

(185) wh Movement: in the structure

[_S[COMP X₁, X₂, X₃, ±WH], X₅, wh, X₇]

the sixth term fills the position of X₂ and is replaced by PRO.

+WH is Q; -WH is R and also the that in ordinary complements. Hence (185) is wh Movement in both questions and relative clauses. The 'wh' in term 6 is not the formative wh, but

a feature attached to the constituent that actually moves. Hence, in to whom did you talk?, the wh is attached to the prepositional phrase to whom.

This treatment avoids a difficulty which would otherwise appear in Chomsky's theory of wh Movement. Chomsky proposes that wh Movement removes a wh word from an embedded S by moving it on each cycle to the COMP of the \bar{S} being cycled on. Hence one gets who does Bill think Mary likes by way of the intermediate stage Bill thinks who Mary likes. Since wh Movement may either extract an NP from within a PP or else move the whole PP, we have a problem in explaining the ungrammaticality of who does Bill think to Mary gave a record. By saying that in the underlying structure of to whom does Bill think Mary gave a record, the feature wh is attached to the PP, we explain why the entire PP must again move when we reapply (185) to the intermediate structure Bill thinks to whom Mary gave a book.

This formalization also accomplishes the desirable effect of eliminating the 'Pied Piping Convention' of (Ross 1967). In Pied Piping, the wh movement transformation mentions a wh-marked term, and the rule actually moves another. An attempt to build this into a theory of rule application would involve substantial complications. Under Chomsky's treatment, the terms mentioned in the structural description are those used in the structural change.

Recent work by Bresnan, some of which is presented in (Bresnan 1974b), promises to provide an alternative to Chomsky's account in which both the Pied Piping Convention and the abstract wh are eliminated.

I will close by pointing out that preposing of NP_{rel} is a minority strategy: it is quite common in Indo-European, but rather rare otherwise. I might also add that I have found no counterexamples to the claim of (Bresnan 1970) that wh words in relative clauses and questions move across variables to the right, but not to the left.

1.3. The Extraction Analysis: I will here discuss a variety of languages in which there exist phenomena that suggest the correctness of the proposal that the heads of embedded relative clauses with heads are extracted from within them. I do not believe that these descriptions contain knockdown arguments for the proposals, but the situations described are such that both friends and foes of this analysis should investigate carefully.

1.3.1. Japanese: In many languages we observe a restriction that when the embedded relative clause has a head, NP_{rel} must be pronominal. This is compatible with and somewhat supportive of the extraction analysis. On the other hand it would appear that if NP_{rel} and NP_{hd} could be full NP with different head NP, the extraction analysis would be completely disconfirmed.

At first blush this is the situation obtaining in Japanese. In section 1.1.1.2.2. I observed the

grammaticality of the following:

(186) watakusi ga sono hito no namae
I SUBJ that person GEN name OBJ

wasurete simatta okyaku-san
have forgotten guest

"a guest whose name I have forgotten"

(Martin 1972) describes a similar construction which appears in certain dialects of English: "The are the guys who Bill says the bastards stole your car!" This construction is highly marginal, many speakers rejecting it out of hand. The position of NP_{rel} is occupied by an epithet, and the entire construction has a distinctly pejorative tone. (186), on the other hand, is a perfectly ordinary noun phrase of Japanese. I suspect, then, that Martin's examples are derived by some sort of non-transformational deformation of syntactic structures: amalgamatory insertion of an epithet into an empty position created by the preposing of who. The process is perhaps a syntactic counterpart to the phonetic and morphological deformations described in Nootka by Sapir (1963).

(186), on the other hand, appears to be a bona fide product of Japanese syntax, and to destroy any hope for an extraction analysis of Japanese relative clauses. There, however, considerations which potentially reverse the import of (1986).

Kuno (1973) has proposed that NP_{rel} in Japanese is always the theme of NP_{rel}: the theme being the preposed NP followed by wa that was mentioned in 1.1.1.2.2.

The theme needn't have a coreferent in the clause. If there is a coreferent, however, it is most usual for it to be deleted. Under certain circumstances, however, it needn't be, and may surface as a full NP with head N distinct from that of the theme. I refer the reader to (Kuno 1973) and (McCawley 1972) for discussion. We have thus (187), in which the theme has no coreferent, and (188), in which the coreferent of the theme is a full NP distinct from the theme:

- (187) Sakana wa tai ga ii
 fish THEME red-snapper SUBJ good-is
 "Speaking of fish, red snapper is the best."

- (188) ano okyaku-san wa watakusi ga sono hito
 that guest THEME I SUBJ that person
 no namae o wasurete simatta
 GEN name OBJ have forgotten
 "Speaking of that guest, I have forgotten his name"

There is, however, the requirement, common to all anaphora, that the coreferent be a more general noun phrase than the initial theme. Hence (189) is ungrammatical:

- (189) *ano hito wa watakusi ga sono okyaku-san
 that person THEME I SUBJ that guest
 no namae o wasurete simatta
 GEN name OBJ have forgotten

With this in mind, we may reconsider (186)..

It is required that there be no theme on the surface in relative clauses. Hence (190) are ungrammatical noun phrases:

- (190) a. *sono okyakusan wa watakusi ga sono hito no
 name o wasurete simatta okyakusan

- b. *sono hito wa watakusi ga sono hito no
 namae o wasurete simatta okyakus-san

This theme must then obligatorily disappear.

Fiengo (1974) has pointed out the suspicious nature of positing elements which are 'positive absolute exceptions' to deletion: elements that are obligatorily identical to some other element and obligatorily delete under identity with it. We have two alternatives to postulating that the vanishing theme of the relative clause is obligatorily identical to the head and obligatorily deleted due to identity with it. We can suppose that the theme is moved into head position, or we can suppose that it is underlying a pronoun or a null element. If we pick this latter alternative, we will be violating the generalization noted with respect to *(189), that a theme must be less general than its coreferent. The former analysis avoids this problem, as well as the problem of positing such obligatorily identical obligatorily deleting elements.

As the extraction hypothesis would predict, and as we would expect anyway, the head of the relative clause must be less general than any surviving coreferents within it. Hence (191) is bad, just as is (189):

- (191) *watakusi ga sono okyakusan no namae o
 I SUBJ that guest GEN name OBJ
 wasurete simatta hito
 have forgotten person
 "the guest/person whose name I have forgotten"

Kuno's hypothesis clearly removes (186) from the class of

clear counterexamples to the extraction analysis, and may well convert it into a strong argument for the proposal. It also eliminates a counterexample to the general claim that when there is a head to an embedded relative clause, NP_{rel} must delete or be pronominal.

1.3.2. Micmac: This example was presented by (Hale 1970).

It involves the category of obviation. When there are two third person NP in an S, the second becomes obviative. This is illustrated in the following:

- (192) a. $t\tilde{j}imn$ elogoet
 man work
 "The man is working."
 b. $\bar{e}pit$ nemiat-1 $t\tilde{j}imno-1$
 woman see-OBV.OB man-OBV
 "The woman sees the man."

But if the subject of a sentence (the first NP in it) is NP_{hd} of a relative clause in which NP_{rel} is the object (second NP in S_{rel}), then NP_{hd} becomes obviative in accordance with the situation prevailing in S_{rel} , not in accordance with the structure of the main clause:

- (193) $t\tilde{j}imno-1$ $t\tilde{a}n$ $\bar{e}pit$ nemiat-1 na elogoe-litl
 man-OBV REL woman see-OBV.OB prt work-OBV.SUBJ
 "The man who the woman sees is working."

NP_{hd} is thus here being assigned to a grammatical category on the basis of the status of NP_{rel} .

1.3.3. Persian:⁶ Persian is an SOV language, but it has prepositions, preceding conjunctions, and following modifiers in NP. Relativization is reminiscent of that in Demotic Greek. The relative clause is a post-

relative, with NP_{rel} deleted if it is a subject or an object, otherwise left behind as a pronoun. There is, however, no clitic/nonclitic distinction.

There is a formative e (which I gloss MD), which is attached to the head of any post-head modifier if that modifier is itself followed by a modifier. There is also a Specific Accusative marker ra, which I shall gloss as ACC. This marks direct objects that are specific. See (Browne 1972) for discussion of the function of ra. ra follows the NP, and e is not inserted before it. Hence we have the following:

- (194) a. ketab-e bozorg (ra)
 book-MD big ACC
 "(the) big book"
- b. ketab-e bozorg-e man (ra)
 book-MD big-MD I ACC
 "my big book"

Note that possession is rendered as in (194b) by placing the possessor NP after the head as if it were an adjective.

In the relative clause construction the e does not appear. Instead NP_{hd} is followed by a formative i which may also be placed after an NP to render it indefinite. Hence:

- (195) a. ketab-i (ra) ke didam
 book-IND ACC REL I saw
 "the book I saw"
- b. mard-i ke be u ketab didam
 man-IND REL to him book I gave
 "the man I gave a book to"

But there is a strange twist in the use of ra. Normally ra is obligatory in a specific object. But if one has an NP_{hd} that is a direct object in the main clause where NP_{rel} is a subject in the relative, then ra is optional on NP_{hd}, and, likewise, if NP_{rel} is subject in the main clause and NP_{rel} is object in the relative clause, then ra is optional again. Hence it appears that when an NP is modified by a relative clause one may look either at the role of NP_{hd} in the matrix or of NP_{rel} in the relative clause to determine the case-marking of NP_{hd}.

Some examples of this from Lambton (1953) are:

- (196) a. an ~~zeni~~ (ra) ke diruz ~~amed~~
 that woman:IND (ACC) REL yesterday came
 ~~didem~~
 I saw
 "I saw the woman who came yesterday."
- b. ~~zeni~~ (ra) ke didid injast
 woman:IND (ACC) REL you saw is here
 "The woman you saw is here."
- c. ketab-i (ra) ke be ~~men~~ dadid
 book-IND (ACC) REL to me you gave
 gom [▼]sode ~~est~~
 is lost

From these facts of case-marking, and from the appearance of the i (recall that NP_{rel} in Crow internal head relative clauses have indefinite morphology) one might well be able to work up an argument that the heads of Persian relative clauses are extracted from within them.

(Jeanne 1974) has proposed an analysis of Hopi

relativization which makes curcial use of the inneritance by NP_{hd} of the case of NP_{rel} in a manner somewhat reminiscent of, although significantly different from, Persian.

Before leaving the subject I will observe that the available evidence for the extraction analysis all involves cases where NP_{rel} is not a relative pronoun, but is an ordinary pronoun or is deleted. Consider in English the contrast the headway (that) we made and *the headway which we made. This is comforting in light of the fact that one of the major problems with the analysis is insuring that the wh formative on relative pronouns gets universally left behind during extraction.

Footnotes to Chapter 1

1. Much of the research in this chapter was supported by grant OEC-0-70-4986(8234) from the Office of Education to Stephen Anderson at Language Research Foundation. The contents of this chapter differ substantially both from the report to OEC co-authored with Anderson and also from various preliminary drafts of mine that have been informally circulated. Motu, Tagalog, French and Breton were omitted because Anderson wrote or revised the sketch, and Hopi, Welch and Dagbani were omitted for reasons of space and time. Japanese was added, and Navajo and Marathi were substantially expanded.

I am indebted to Ken Hale, Dave Perlmutter, Hu Matthews, Paul Kiparsky Haj Ross and Mary Lou Walch and Roy Wright

for commenting on earlier drafts of this chapter. I am also indebted to many people for helping me with particular languages. They are indicated in footnotes, in the text, and in the index of languages and sources that appears as an appendix to this chapter. I finally thank Stephen Anderson for getting me interested in the subject and supporting much of my work in it.

2. Sandy Chung has assured that Churchward (1934), upon which this is based, is accurate for the modern language.

3. Robert Underhill taught me most of what I know about Eskimo.

4. I have been greatly assisted with Japanese by Susumu Kuno and Shosuke Haraguchi.

5. Wha-Chun Kim provided the information about Korean.

6. Sharad Gupti was extremely generous of his time in teaching me enough about Marathi to write this section. S.D. Joshi volunteered the first referential multiple-headed relative clause I encountered. Kashi Wali has also been quite helpful.

7. Wayles Brown has given me advice on Persian.

Appendix to Chapter 1

Index of Languages and Sources

I give first the language, then the pages on which I discuss it, then reference works on it, and finally those who have provided me with information about it. Only languages receiving substantial discussion are mentioned.

Crow: pp. 124-131; (Lowie 1944); Dale Oldhorn, George Reed, Rose Chesarek.

English: pp. 23-31, 75-82, 110-121.

Eskimo: pp. 37-43; (Kleinschmidt 1851), (Schultz-Lorentzen 1945), (Bergsland 1955); Robert Underhill.

Faroese: pp. 36-43; (Lockwood 1964).

Greek (Modern): pp. 154-159; Dimitri Konstantinidi.

Hindi: pp. pp. 93-97; (Donaldson 1971).

Hottentot: pp. 58-61; (Meinhof 1909).

Japanese: pp. 45-50, 161-165; (Kuno 1974), (McCawley 1972); Susumu Kuno, Shosuke Haraguchi.

Mabuiag: pp. 89-98; (Klokeid 1970).

Marathi: pp. 98-110; (Southworth and Kavadi 1965); Sharad Gupti, Kashi Wali, S.D. Joshi.

Micmac: pp. 165; (Hale 1970).

Navajo: pp. 65-75, 110-121; (Platero 1974), (Perkins 1974), (Kaufman 1974), (Platero and Hale 1974); Ken Hale, Paul Platero.

Persian: pp. 165-168; (Lambton 1953), (Browne 1970); Wayles Browne.

Samoan pp. 33-36; (Churchward 1934); Sandy Chung.

Sanskrit: pp. 96-97; (Wackernagel 1930).

Swahili: pp. 131-149; (Ashton 1944), (Loogman 1965); (East African Swahili Committee 1956-58).

Tibetan (Classical): pp. 57-58; (Lalou 1950).

Turkish: pp. 50-57; (Lewis 1953, 1967), (Underhill 1972).

Walbiri: pp.85-89; (Hale 1970), (Hale 1971, 1974 class lectures).

2. Comparative Clauses: In this chapter I will devote my attention to the comparative clause construction of English. I will follow the arrangement, and, to a large degree, the content, of the classic article on the subject by Bresnan (1973).¹ I will first consider the head to which comparative clauses are attached, and the the relation between the head and the clause.

In the treatment of the head I will adopt (with minor revisions) the analysis proposed by Bresnan, and will extend it to a construction not considered by her, the indefinite comparative construction of such examples as the more you study, the less you know. My primary concern will be, however, with the metatheory in which the analysis is formulated. I shall formulate certain processes which Bresnan leaves vague, such as the rule of QP Raising, and, more significantly, will propose a system of conventions on rule application and constraints on structure that, given some rather strong assumptions, allow one to make a case that the analysis given is in fact the most highly valued one for the data considered, and that in several cases the most highly valued analysis for subsets of the data predicts the remainder. This amounts to making the claim that Bresnan's analysis is internally justified within a linguistic theory with a significant degree of explanatory adequacy.

Bresnan supposed that comparative clauses were generated within the determiners of the quantifier

phrases that they modify. Using multiple headed comparatives that are similar to the multiple headed relative clauses of the preceding chapter, I will show that such a source is untenable. I shall propose that comparative clauses are generated in underlying structure in the position that they occupy on the surface, and will explain the phenomena previously taken to support determiner generation of comparatives in terms of a theory of extra-constituent structure relations of the sort extensively used in the previous chapter. This time, however, I will take a far more formal approach to the material, providing a formalization of the representation of the relations, and proposing a system of language-universal conditions governing permissible assignments of systems of relations to constituent structures. These principles will also cover relative clauses as presented in the previous chapter, and therefore constitute a unified theory of determiner complementation.

2.1. The Head, Revisited: I will here review the analysis provided by Bresnan of the head constituent to which the comparative clause is attached. I shall assume Bresnan's base rules, and recast the transformational part of her analysis within a particular metatheory. I shall make a case that if the basic data from which language learning proceeds is assumed to consist of a set of surface string-deep structure pairs, then the transformational part of the analysis is the most highly

valued analysis provided by the metatheory that is consistent with the data. I will furthermore attempt to support certain articles of the metatheory on the grounds that they lead to analyses being selected by subsets of the total range of data which those analyses explain. The analysis will thus be argued to be internally justified, and the metatheory to be explanatorily potent.

The assumption that the basic data from which language learning takes place consists of surface string-deep structure pairings is unrealistically strong. Nonetheless I believe that results attained by means of it may be valid and interesting. For it is likely that given a sufficiently restrictive theory of the semantic interpretation of deep structure, there may be relatively few ways of construing a string of words and phrases of known meaning into a sentence with a coherent reading.

Consider, for example, the phrase many too many marbles. Suppose we are ignorant of the syntax of the language, but we know that many and too many are quantity expressions, the latter signifying excessive amount, and that marbles is a count noun. Then one of the few ways of taking the phrase semantically will be to take the first many as qualifying too many, and many too many as qualifying marbles. About the only alternative I can think of is to take it as the predication many is too many marbles, or something like that. The context might well serve to eliminate many formally possible ways of semantically

combining the elements of the string.

Given a sufficiently restrictive theory of semantic interpretation, this string could lead to a uniquely determined addition to the base component of the language being learned: namely the addition of the rules that generate a deep structure that can be interpreted as having the formally possible and pragmatically plausible reading, and that can be related to the string by a minimal, in this case by a null, set of transformations.

These results, if valid have an interesting implication for research directed at constraining linguistic theory. The greatest part of such work has been devoted to constraining the transformational component, the base being comparatively neglected. In the following pages I will assume a transformational component that is quite unconstrained by current standards of work in the Extended Standard Theory. It seems to me likely that if a sufficiently restrictive theory of the base were found, one could show that the theory determined the analysis for the data without making the assumption that the data included the deep structures for the strings considered. Rather one would suppose the data to include information on the semantic type of words and phrases in the strings. The implication is that work on constraining linguistic theory should be focussed not on the transformational component, but on the base.

2.1.1. Basic Structures: I shall begin by reviewing Bresnan's basic analysis of QP, AP and predicative NP. I shall be concerned with the material in her sections 1.1. - 1.4., omitting partitives.

Bresnan had no analysis for nodes of type V (V, VP, and perhaps S, etc.), and her analysis of N nodes was essentially limited to the predicative or adjectival NP found in predicate nominal and certain nonreferential positions (e. g. I have never seen as magnificent a coelacanth as this specimen), although she ventures an occasional diagram for ordinary NP. I shall remain within these limitations. Although she did formally adopt an X-bar analysis, her analysis was so given as to be easily translated into one.

In Chomsky's (1970) exposition of the X-bar notation, he proposed that there was a small set of language-universal primitive categories including at least N, V, A and S, which might themselves be composed of features. There are then four diacritic features: 0, 1, 2 and S ec.

The following rule skeletons are then specified:

- (1) a. $S \rightarrow N^2 V^2$
 b. $X^2 \rightarrow [\text{Spec}, X^1] X^1$
 c. $X^1 \rightarrow X \dots$

'...' is to be the material in the complement of the various categories. $[\text{Spec}, X^1]$ is taken to comprise the system of articles, possessives and demonstratives; $[\text{Spec}, V^1]$ the auxiliary system; and $[\text{Spec}, A^1]$ is

hypothesized to comprise the system of degree modification.

Chomsky's schema (1a) is irrelevant to her discussion; the other two, however, she accepts, but makes certain changes in the framework. She adopts a new category Q, which contains the quantifiers, such as few, more, enough, etc.. Note that the Q are the linguistic quantity expressions, rather than the logical operators \exists and \forall . I shall thus take the category variables in the rules as ranging over N, V and A, with A comprising both adjectives and adverbs. It would be wrong to attribute to Bresnan the positions that the basic category features are N, Q and A. Rather she should be taken as suggesting that the basic feature system should be so constructed to deliver these categories, presumably along with others.

Furthermore, she alters the interpretation of the Spec nodes. For [Spec, N¹], she preserves Chomsky's interpretation, especially putting the indefinite article there, and also a null article she postulates to be present in anarthrous mass and plural NP such as beer and linguists (see Fiengo 1974) for more discussion of this hypothetical null article). [Spec, Q¹] is taken to comprise the degree particles er, too, as, so, etc.; more being derived from er much and less and fewer from er little and er few, respectively.

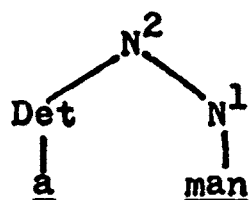
On the subject of [Spec, A¹], however, she departs from Chomsky's speculations and from the work of previous lexicalist writers. Whereas (Bowers 1970) and (Selkirk 1970)

analyze such expressions as as tall as having the degree particle as as the contents of $[\text{Spec}, A^1]$, Bresnan provides a different analysis, to which we shall turn shortly, of degree particles that precede adjectives and adverbs. What she identifies as $[\text{Spec}, A^1]$ is rather the class of adverbial intensifiers including merely, utterly, perfectly, rather, quite, etc..

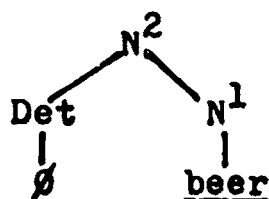
She also suggests a change in the interpretation of the $[\text{Spec}, X^m]$ notation. Instead of taking it as designating a category, that is, a node, she suggests taking it as being an abbreviation for the categories expanded in its position. She omits $[\text{Spec}, X^1]$ nodes from her trees, and has the material expanded in these positions dominated by Det in NP and QP nodes, and by Adv in AP nodes. I shall follow these conventions.

Hence we attain the following series of analogously constructed phrases:

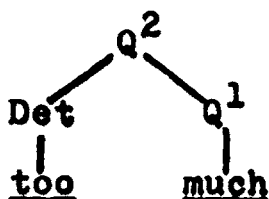
(2) a. a man:

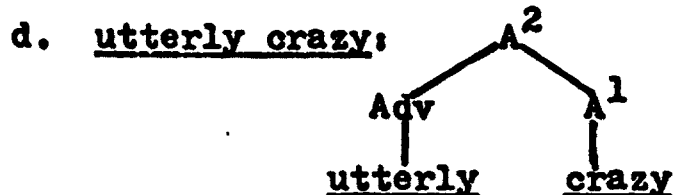


b. beer



c. too much





In these structures I have omitted the X^0 nodes, and will consistently do so when they play no role in the discussion.

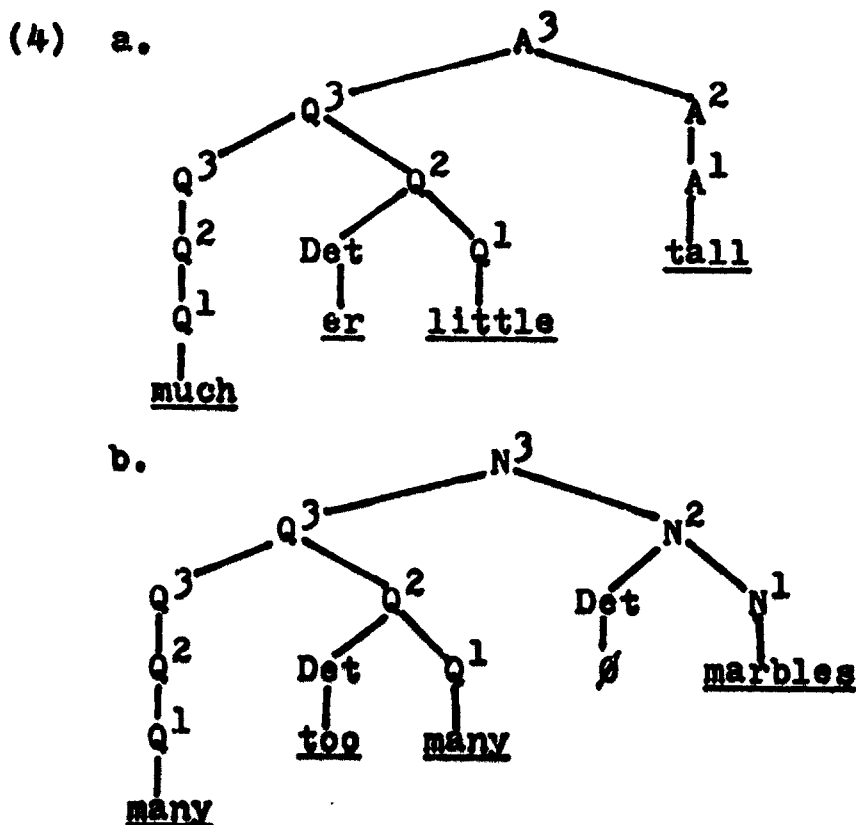
Bresnan's proposal for degree modification of AP and quantity modification of NP is based on her observation of how degree modification of QP works. She observes that in such examples as (3):

(3) a. (much less) tall

b. (many (too many)) marbles

the phrasing is as indicated by the parentheses.

Bresnan explains the phrasing by reanalysing QP, AP and NP as Q^3 , A^3 and N^3 , respectively. The examples of (3) are thus given the structures (4):



Justification for the constituent structure (4b) is given in the form of a rule of QP Shift (pg. 290) which derives (5) from (3b) by shifting Q^2 around N^2 :

(5) many marbles too many.

This rule may be formulated as (6):

(6) QP Shift:

| | | | | | |
|-------|---|-------------|---|-------|---------------|
| Q^3 | - | Q^2 | - | N^2 | OPT |
| 1 | | 2 | | 3 | \Rightarrow |
| 1 | | \emptyset | | 3#2 | |

Note that this rule as formulated can misapply rather spectacularly. It can, for example, derive she gave many marbles too many from she gave many too many marbles.

I will propose conventions to block this and other misapplications. Given the generally well-founded prohibition against moving nonconstituents, the argument for the phrasing indicated in (4b) is immediate.

We thus arrive at the following phrase structure rule:

(7) $x^3 \rightarrow (Q^3) x^2$

An example of a Q^3 preceding a $[Spec, A^1]$ is he is less crazy than she is.

We can see that (7) when applied in AP will yield in addition to the grammatical outputs like (3a) the ungrammatical outputs of (8):

- (8) a. *as much intelligent
 b. *too much intelligent
 c. *that much intelligent.

A rule deleting much before A^2 would derive from (8)

the grammatical (9), thereby providing a source for degree modification of AP:

- (9) a. as intelligent
- b. too intelligent
- c. that intelligent.

There is a difficulty, however, alluded to in Bresnan's footnote 4, in that while most adjectives, such as tall, reject overt much: *much tall; some, like different, accept it: much different. Similar to different are a large class of what one might call intrinsically comparative adjectives, such as alike and akin. But some comparative adjectives are not in this class: *much similar; and some that are are not comparative, such as aware and amused. I am indebted to Wayles Brown for pointing out to me that an inordinate number of these adjectives begin with the prefix a-.

We find the following sample paradigms:

- (10) a. *much intelligent
- b. *little intelligent
- c. as (*much) intelligent
- d. *as little intelligent
- e. more intelligent
- f. less intelligent
- (11) a. much alike
- b. little alike
- c. as (much).alike
- d. as little alike

e. more alike

f. less alike

From (10) we glean that intelligent disdains to be preceded by Q^0 ; both much intelligent and little intelligent are bad, but whenever much Deletion applies, or the rule applies that permutes er around a following Q^0 , then the examples are good. alike in (11), on the other hand, appears to be devoid of this restriction. Both much alike and little alike are grammatical.

Bresnan proposes to deal with ordinary adjectives by having much Deletion be obligatory, suggesting in footnote 4 that the rule is optional with such adjectives as alike and different. But this runs afoul of the fact that ordinary adjectives reject little as firmly as they reject much, without rejecting less and more. The facts concerning little would seem to call for a surface(y) filter ruling out little A sequences. But then it is strange that for all adjectives that are exceptions to the filter, much Deletion is optional.

These considerations plainly show that in fact much Deletion is always optional, and that it is the surface filter that that is governed. For it presumably costs less in features to specify the category Q^0 than to specify its member little, and therefore the filter motivated by the nonappearance of the little A sequences will be a $*Q^0 A$ filter rather than a $*\underline{little} A$ filter.

We can find further support for this position by

noting that ordinary adjective phrases such as tall and intelligent are not ambiguous between their ordinary senses and a sense in which they mean 'very tall' or 'very intelligent' (under normal intonation and stress). Therefore a derivation from much tall to tall or from much intelligent to intelligent by much Deletion is not possible. much Deletion can only apply when much is preceded by its degree particle. Nonetheless we find *enough tall, *much intelligent. Since these forms cannot be blocked by turning them into something else with an obligatory transformation, we need a filter to rule out much A sequences as well as little A sequences. Both of these effects, as well as the apparent obligatoriness of much Deletion with ordinary adjectives, can be accomplished with a lexically governed filter on Q^0 A sequences.

Further support for this analysis may be found by considering the behaviour of enough: *enough tall, tall enough, enough alike, alike enough. Enough permutes obligatorily around ordinary adjectives, but optionally around those which can be preceded by much and little. Given Bresnan's conclusion that enough is a Q, this is what we predict.

I will now formulate some rules. much Deletion I formulate as follows:

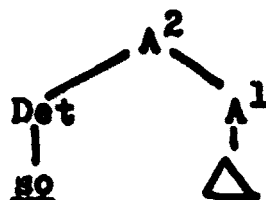
(12) much Deletion:

| | | | | | |
|-----|---|-------------|---|----------------|----------|
| Det | - | <u>much</u> | - | A ¹ | |
| 1 | | 2 | | 3 | OPT ⇒ |
| 1 | | ∅ | | 3 | |

The reader will first note that the rule as formulated can misapply in a way analogous to that pointed out for (6), misderiving too stale bread from too much stale bread. This problem will be solved by a constraint on rule application.

Another problem is term 3. Its category features pose no difficulties: they are needed to block *too more bread and *as soup, etc.. The superscript presents serious problems. Consider the pair very much so, *very so, pointed out to me by Ross. I shall want to analyse so in such phrases as having the form (13):

(13)



We cannot, therefore, let (12) specify merely category features without bars. Given that bars must be specified, 3 is plainly wrong and 2 is against the evidence just cited. My choice of 1 rather than 0 is arbitrary and descriptively inconsequential.

This solves the descriptive problem, but the explanatory problem remains. If we could find a principle determining a rule with superscript 1 in the last term on the basis of data like too tall, *too more corn, we would

explain very much so, *very so rather than merely describe it. At present I have no such principle. The reader will also note that too utterly crazy, *too much utterly crazy presents a descriptive problem for (12), suggesting, contrary to very much so, *very so, that the superscript on term 3 should be 2 rather than 1. I shall meet this problem eventually, but for the present shall defer treatment of it.

The other problem is term 1. Its effect is to block the derivation of tall from much tall. The problem is how it is learned. In order to require it to be in the rule one must specify in the data that the string tall lacks much tall as an underlying structure. It is very unclear where this information might come from. Perhaps having tall ambiguous between tall and much tall is a universally unacceptable form of ambiguity, and grammars producing such ambiguity for sentences in the basic data are automatically discarded. Such a constraint on ambiguity might also explain while the rule deletes only much instead of both much and little (since the category Q^0 is closed, we cannot invoke recoverability of deletions, lest pronoun drop be made an impossible rule).

Finally, the optionality of the rule is no problem, given too much alike, etc., in the data.

The innocuous seeming rule of much Deletion has proved to be rife with explanatory problems upon close examination.

This suggests that efforts should be directed towards eliminating it. I shall nonetheless retain the rule in the present work.

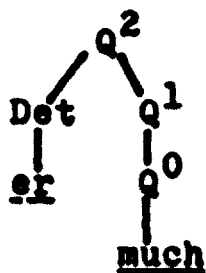
I now consider the rule permuting er around Q^0 . The problem is to get this rule to keep the filter from throwing out more intelligent and less intelligent. If we suppose that the only kind of adjunction available is Chomsky adjunction, then the only way to do this is to adjoin er to Q^1 :

(14) er Shift

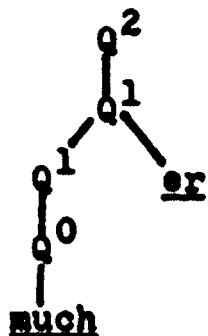
$$\begin{array}{ccc} \text{er} & - & Q^1 \\ 1 & & 2 \\ \text{er} & & 2\#1 \end{array} \xRightarrow{\text{OBL}}$$

(14) will derive (15b) from (15a):

(15) a.



b.



One will note from (15) that I intend a derived constituent structure convention whereby it is the node mentioned that is moved, with nodes exhaustively dominating it vanishing, as does the **Det** node in (15a). This kind of application

is not possible within the formalization of (Peters and Ritchie 1973), although it is possible in (Ginsburg and Partee 1969). Note that although these latter authors do not provide for Chomsky adjunction, this could be amended. The rule can be gotten to be obligatory by the presumption that OBL is a cheaper marking than OPT (or is not a marking at all).

Now for the filter. Since the filter is lexically governed, I shall assume that it must involve the category A^0 . We may thus notate it as (16):

$$(16) \quad Q^0 A^0 \text{ Filter:} \\ *Q^0 A^0$$

We may observe the usual form of misapplication: the filter as it stands will star many old people and we gave many stale bread. This problem will shortly be remedied.

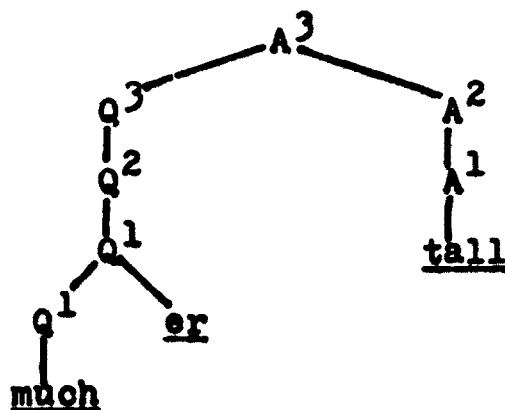
Suppose then that the rules (including the filter) are cyclic, and that rules cycle on X^3 nodes. Then er Shift will automatically apply before much Deletion and the filter. If we suppose in addition (as will turn out to be necessary) that filters are extrinsically ordered with respect to the rules, then the grammaticality of too tall will force us to order the filter after much Deletion. The rules with these orderings will then suffice to deliver the facts of (10-11). I think that it is furthermore reasonable to believe that given a metatheory with transformations and filters of the form indicated, the data of (10-11), taken to be a pairing of each string

with the set of its deep structures, determines the analysis consisting of (12, 14, 16), excepting the problem of the superscript on term 3 of (12).

None of these rules are formulated with end-variables, since there is nothing in (10-11) that motivates end-variables. Nonetheless we want the rules to apply as if they had end-variables: we want er Shift to derive much more intelligent from much er much intelligent, we want much Deletion to derive much too intelligent, and we want the filter to block *much too much intelligent. We may achieve this effect by supposing that there is a convention that automatically supplies end-variables to rules. Alternatively we might suppose that there is a requirement on the form of rules that they have end variables: then (12, 14, 16) would have to be replaced by their variants with end-variables. In either case, the rules motivated by (10-11) would then apply in the desired manner in the more complex examples given above.

I will now formulate the rule deriving taller from more tall. At the beginning of the A^3 cycle the structure of taller will be (17):

(17):



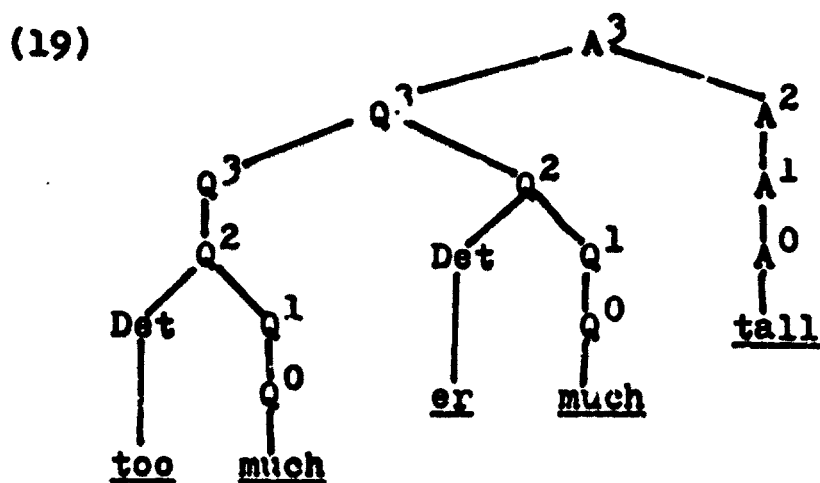
The simplest rule in our theory that could effect the required change is (18):

(18) more Shift:

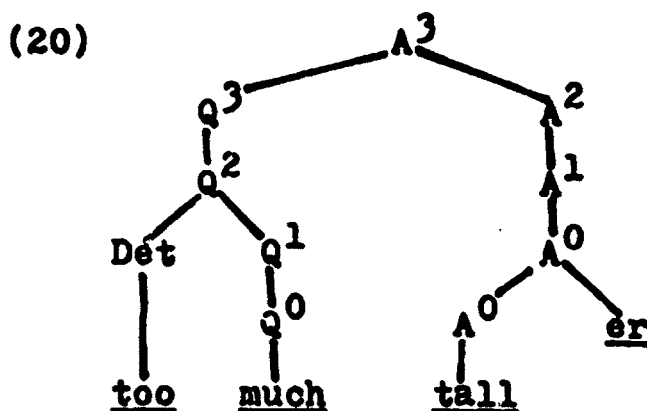
| | | | | | |
|-------------|---|-------------|---|--------|-------------------|
| <u>much</u> | - | <u>er</u> | - | A^0 | \Rightarrow OBL |
| 1 | | 2 | | 3 | |
| \emptyset | | \emptyset | | $3\#2$ | |
| | | | | | |

Note that we would have to assume it to be in the basic data that taller is not underlain by less tall. I presume that because the rule is governed by the adjective, term 3 must have the superscript 0.

We may now show the assumption that the rules are strictly ordered does some work. Consider the underlying structure of too much taller:



On the second Q^3 cycle in (19) we apply er Shift, and subsequently on the A^3 cycle we apply more Shift, yielding the derived constituent structure (20):



Since too much taller is acceptable, and tall is not an exception to the filter, we see that the application of the filter must precede that of more Shift. We have already noted on the other hand that much Deletion must precede the filter. We therefore deduce by transitivity of ordering that much Deletion precedes more Shift.

This is independently evidenced by the fact that *too taller is ungrammatical. The assumption of strict ordering in conjunction with the preceding data thus predicts *too taller.

On the other hand, no evidence can be found for ordering er Shift. Hence we arrive at an analysis consisting of the following rules:

- | | | | | |
|------|----|----------------------|-----|------|
| (21) | a. | <u>er</u> Shift | OBL | (14) |
| | b. | <u>much</u> Deletion | OPT | (12) |
| | c. | *Q⁰ A⁰ Filter | | (16) |
| | d. | <u>more</u> Shift | OBL | (18) |
- Curved arrows indicate a cyclical relationship between rules b, c, and d.

The rules are assumed to apply cyclically. The reader will be able to discern that this assumption is not necessary for the present data, and that the analyses of this section, 2.1., can be cast into a noncyclical framework. I shall

nonetheless assume cyclicity because of its greater elegance. Assuming cyclicity, we shall soon see that a principle of strict cyclicity is necessary. But first it will be necessary to give another constituent structure rule.

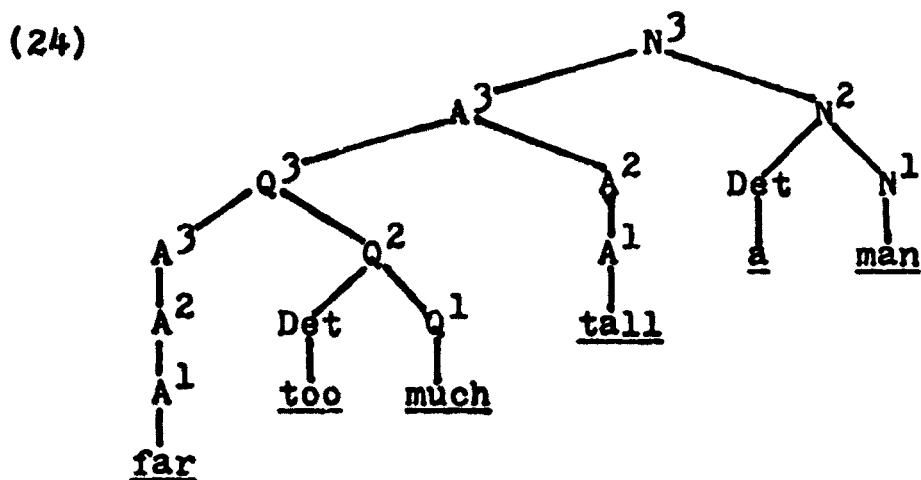
Bresnan finds that not only QP, but also AP appear as predeterminer modifiers of QP, AP and predicative NP:

- (22) a. far more people
 b. as good an answer
 c. as obviously good an answer
 d. far to tall a man.

We may thus replace (7) with (23):

$$(23) \quad x^3 \rightarrow ([\{Q\}]^3)^3 x^2$$

(21) and (23) will assign to example (22d) the structure (24):



Note that N^3 with initial A^3 have a substantially different distribution from those with initial Q^3 or Det; hence the designation predicative NP. Their properties are discussed by Bresnan (pg. 283, 299) and by (Berman 1974), who offers a rather different analysis. Further observe that the contents of Det determine what can precede it

under X^3 : in the QP system, for example, only er and too allow predeterminer QP; in the NP system only the indefinite and null articles permit any sort of predeterminer modification:

(25) a. *as good the answer

b. *more the men.

We may now consider the question of strict cyclicity.

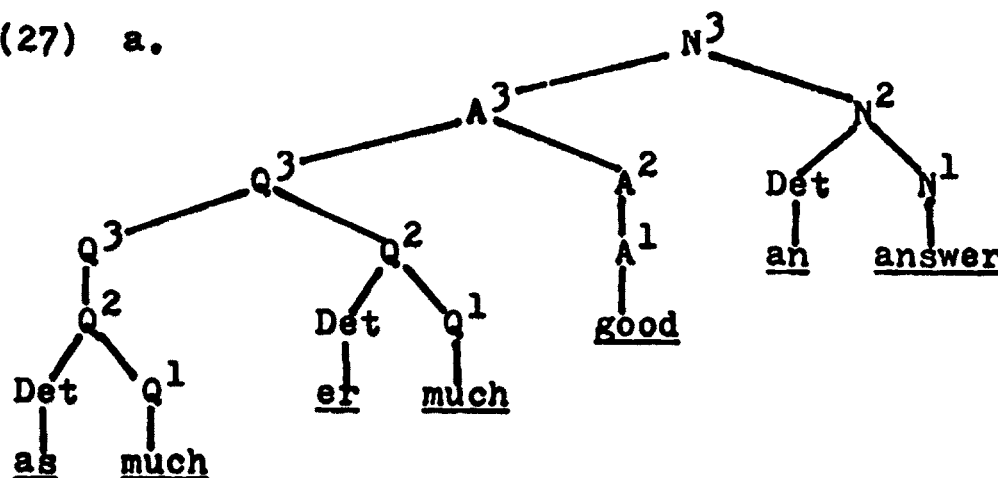
Consider (26):

(26) a. as much better an answer

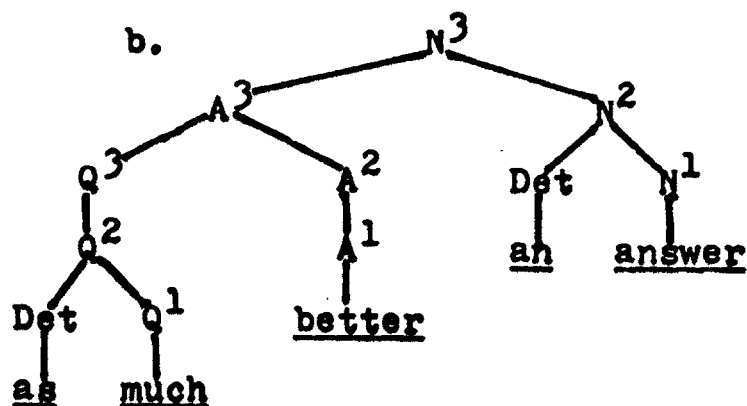
b. *as better an answer

(26a) will be underlain by (27a), which at the end of the A^3 cycle will have the derived structure (27b):

(27) a.



b.



We must keep the filter from ruling out (26a), and much Deletion from generating (26b) from (27b). A principle

of strict cyclicity would accomplish this, since the first crack that the rules get at applying is on the A^3 cycle, where the extrinsic ordering keeps them in line. Then when we get to the N^3 cycle, strict cyclicity will keep them from working, since they would have to operate entirely within the A^3 domain that has already been cycled on.

A conventional formulation of a principle of strict cyclicity would stipulate that a rule not apply entirely within a domain that has already been cycled on. I will put forth a different formulation, combining strict cyclicity with a principle that blocks a class of misapplications that we have been noting in the preceding pages.

I list these misapplications below:

(28) a. QP Shift (6):

she gave many too many marbles → she gave many marbles too many

b. much Deletion (12):

too much stale bread → too stale bread

c. $Q^0 A^0$ Filter (16):

blocks many old people, we gave many stale bread

We may also note that more Shift will derive *I am angrier than sad from I am more angry than sad (see Bresnan pg. 327, and, for a different account, (Ross 1974). (Hankamer 1973) discusses similar sentences in Greek and Latin).

In all of these misapplications we find that the rule

applies so that all of its constant terms (terms specified as constituents) lie within domains that have already been cycled on. For example in (28b) we have the structure $[_N3[_Q3 \text{ too much}][_N2[_A3 \text{ stale}][_N1 \text{ bread}]]]$ (I am not sure of the internal constituent structure of the NP). When much Deletion applies, the disappearing much and its Det lie within the Q^3 , and the A^1 stale lies within the A^3 . Both of these domains have already been cycled on.

I thus suggest the following principle, which subsumes both Strict Cyclicity and what is needed to block these misapplications:

(29) Cyclical Novelty Principle:

The structural description of a cyclical rule is not met unless at least one of its constant terms lies in a domain that has not yet been cycled on.

Observe that this principle would keep from applying a Dative rule that mentioned only the two NP terms. An additional term, such as the verb, would have to be mentioned in order for the rule to ever get to apply. Likewise rules of Raising into subject and object positions would have to mention some term in the matrix, such as the verb. These results seem reasonable.

Further note that the behaviour of QP Shift and more Shift could be accommodated by a constraint against insertion into cyclical domains. It is much Deletion and the filter that necessitate a principle like (29).

The necessity for (29) is explanatory rather than descriptive. We could build the effects of (29) into our

rules by appropriately deploying brackets within them. For example, she formulates much Deletion as follows (Bresnan's example (10)):

(30) Bresnan's much Deletion:

$\text{much} \rightarrow \emptyset / [\dots \text{-- } A]_{AP}$

(But c.f. Bresnan's fn. 5)

Given the present metatheory and the discussion of the preceding pages I would recast (30) as (31):

(31) $[{}_A^3 W_1 \text{ -- Det -- } \underline{\text{much}} \text{ -- } A^1] \xRightarrow{\text{OPT}}$

| | | | |
|---|---|-------------|---|
| 1 | 2 | 3 | 4 |
| 1 | 2 | \emptyset | 4 |

But there is nothing in the basic data of (10-11) that requires the outer A^3 brackets to be there. The simplest rule for that data will lack them. Hence a theory with (29) will explain why *too stale bread is not derived from too much stale bread, while in a theory without (29) one can only describe the fact.

In this subsection I have revised Bresnan's analysis of the basic structures of QP, AP and adjectival NP, and provided some reason to believe that is determined by the metatheory for the data, given some overly strong assumptions about the form of the latter. I have also shown the explanatory significance of the assumption of strict ordering of transformations and filters, the convention supplying end variables, and an extension of Strict Cyclicity, the Cyclical Novelty Principle. The discussion has finally revealed that the rule of

much Deletion is from an explanatory point of view the weakest part of the analysis, inasmuch as the least plausible assumptions about the basic data are required to make it take its descriptively correct form. It would be a vindication of the methods of this chapter should it prove desirable on independent grounds to dispense with this rule.

2.1.2. AP Shift: I here examine the process of AP Shift discussed in Bresnan (1.5.-1.6.). My goal will be to collapse Bresnan's AP Shift rule with the rule of QP Raising that Bresnan postulates to crucially feed it, but does not formulate. I shall here ignore much of the original data considered by Bresnan, especially taking no notice of any facts connected with such. such will be treated in the next subsection.

The attentive reader may have noticed a difficulty with the analysis of 2.1.1., in the form of paradigms like (32):

- (32) a. as good a reply
- b. *an as good reply
- c. *better a reply
- d. a better reply

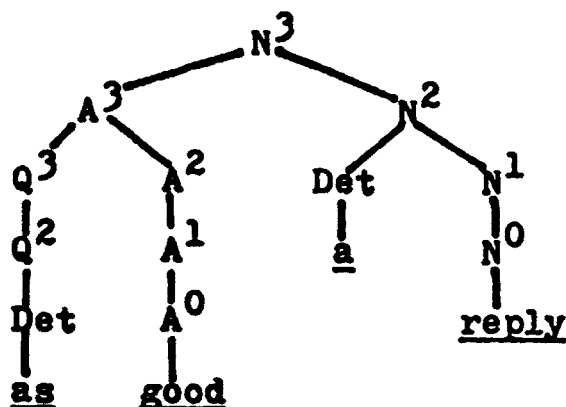
Bresnan proposes to accommodate (32) by a rule of AP Shift to which I shall give the preliminary formulation (33):

(33) AP Shift (preliminary):

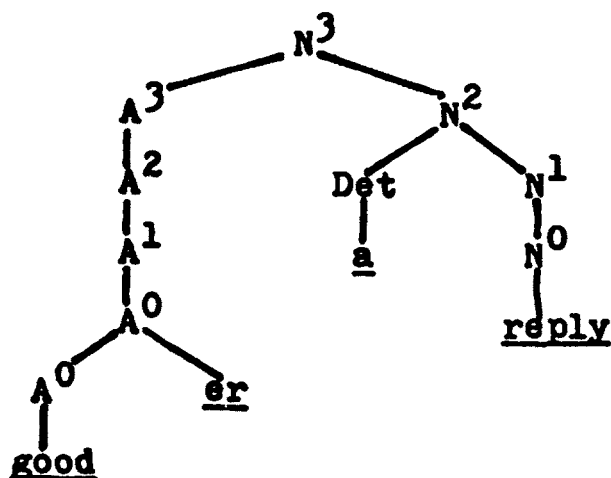
$$\begin{array}{ccccccc}
 [& N^3 & A^2 & - & \text{Det} & - & N^1] \\
 & 1 & & & 2 & & 3 \\
 & \emptyset & & & 2 & & 1\#3
 \end{array}
 \xRightarrow{\text{OBL}}$$

(33) will derive (32d) from (32c), but not (32b) from (32a). To see this consider (34a), the structure of (32a) at the beginning of the N^3 cycle, and (34b), the structure of (32c) at the beginning of the N^3 cycle:

(34) a.



b.



The QP remnant as in (34a) prevents there from being an A^2 initial in N^3 , as required by the outer brackets of (33). On the other hand in (34b) the QP that was initial in underlying structure has been destroyed by transformations, the coup de grâce have been administred by more Shift. Therefore (33) applies, deriving (32d).

But suppose we had a rule that would attach the initial QP much to the A² better: then (33) would be able to apply, deriving (35d). This attachment rule is the QP Raising process. The process will cost less if we can collapse it with AP Shift. We therefore examine the latter more closely.

In the (33) formulation of AP Shift it is assumed that the A² has to move around a Det. We find, however, that what can appear in the Det position after an AP is completely determined: if the NP is count singular, a must appear, otherwise the construction is impossible: *as good beer, *too good the beer, etc. This suggests that the Det position in this construction is syntactically empty, bearing the features [\pm sing, \pm count], determined by the head N. a is substituted by a transformation for a Det that is [$+$ sing $+$ count]. Later in the section I will deal with what happens when the combination of features in Det is otherwise. There are two things we need with regard to the hypothesis that the indefinite article here is underlying null. First, we want some independent evidence that it is true, and second we want some principle to make it true. These will be provided later in the discussion. For the present I shall show what can be done with the assumption that the Det is underlying null.

Given the underlying nullity of the Det of N in examples like (32) and (35), we may simplify (33) by

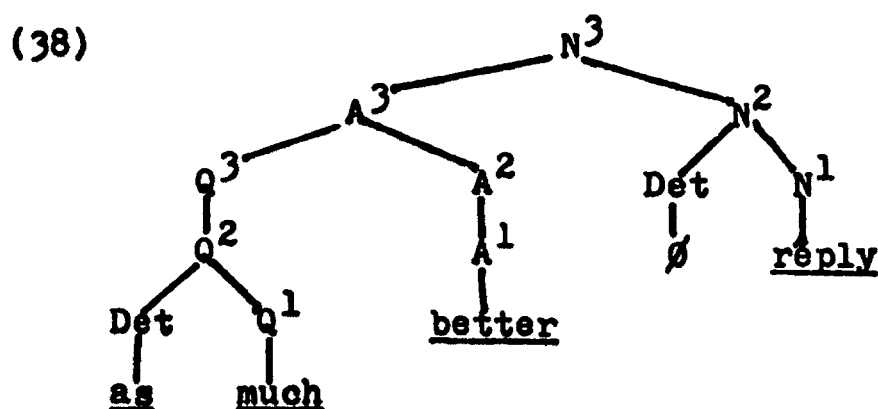
eliminating from it term 2 and ordering it before the a-Insertion rule (Note that since the rules have to be put in some order, the particular order one puts them in is free). Next, we will obviously want to have more general category specifications than A and N for the two surviving terms.

Our rule will thus have the general form of (37):

$$\begin{array}{ccc}
 (37) & [x^3 y^m - x^n] & \\
 & \begin{array}{cc} 1 & 2 \\ \emptyset & 1\#2 \end{array} & \xRightarrow{\text{OBL}}
 \end{array}$$

It remains to identify m and n. n = 3 and n = 2 are clearly out of the question because then the rule could not effect permutation over the empty Det. n = 0 is also wrong because then the lifted material would form a compound word with the N (being Chomsky-adjoined to N^0), and the stress shows that this is not what is happening. We see thus that n = 1.

To determine m is a little trickier. Consider (38), the structure of (35a) at the beginning of the N^3 cycle:



m = 3 we already know is wrong. m = 2 is also wrong, for on the A^3 cycle we would have been able to attach the

Q^2 as much to the A^1 better, and then on the N^3 cycle we could attach the resulting A^1 as much better to the N^1 , thereby generating (35b), *an as much better reply, by subsequent article insertion. We are left with two possibilities: $\underline{m} = 1$, and $\underline{m} = 0$. Either would suffice. I shall assume $\underline{m} = 1$, perhaps on the basis of a principle that high superscripts are cheaper than low.

The rule determined for (32, 35) is thus (39):

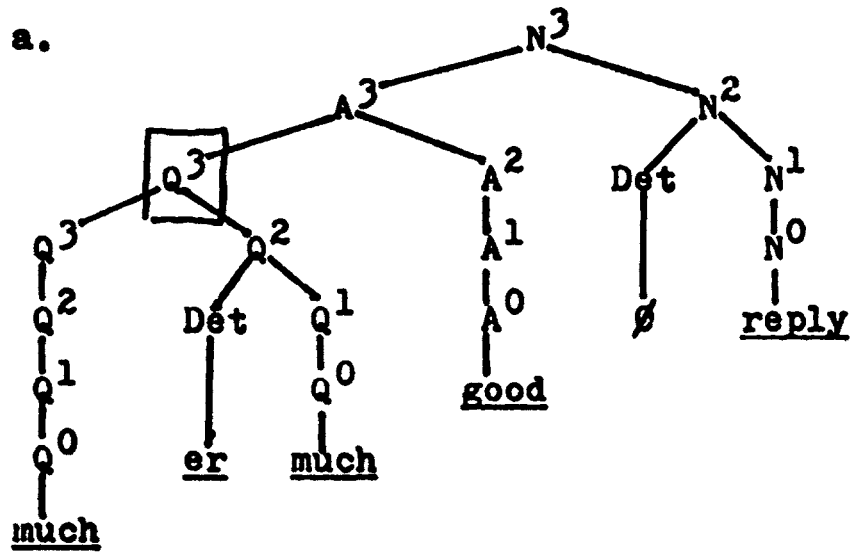
(39) X^1 Attachment:

$$\begin{array}{ccc} [{}_Y 3 X^1 & - & Y^1] \\ 1 & 2 & \\ \emptyset & 1\#2 & \end{array} \quad \begin{array}{c} \text{OBL} \\ \Rightarrow \end{array}$$

The only feature of (39) that is not determined by the data is the superscript on term 1. This is not really essential, and I have proposed a principle that would cause it to be determined to.

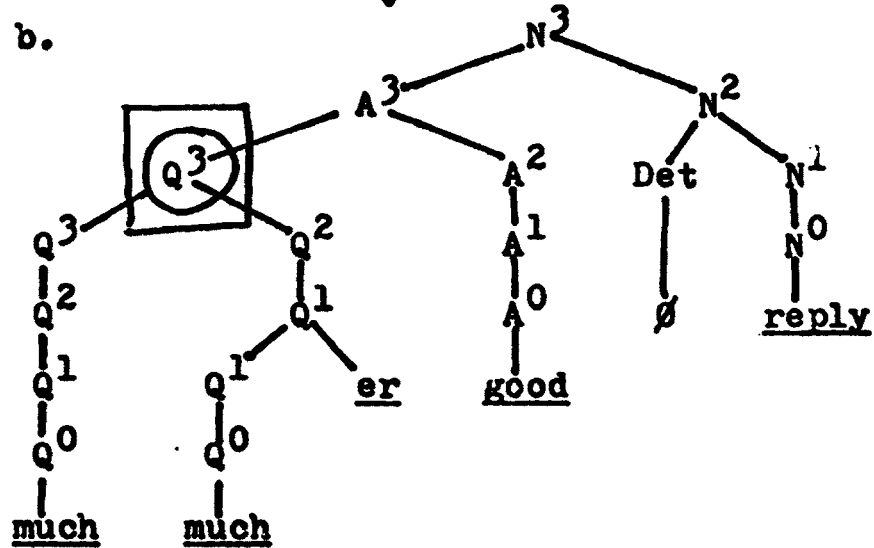
If we order X^1 Attachment after er Shift and before Indefinite Article Insertion, it will derive (35d) from its deep structure (36a). Below I give the derivation, circling that node in each derived tree that was being cycled on to produce the tree from its predecessor, and boxing the node that will be cycled on to produce the next. Indefinite Article Insertion is abbreviated on the final tree.

(40) a.



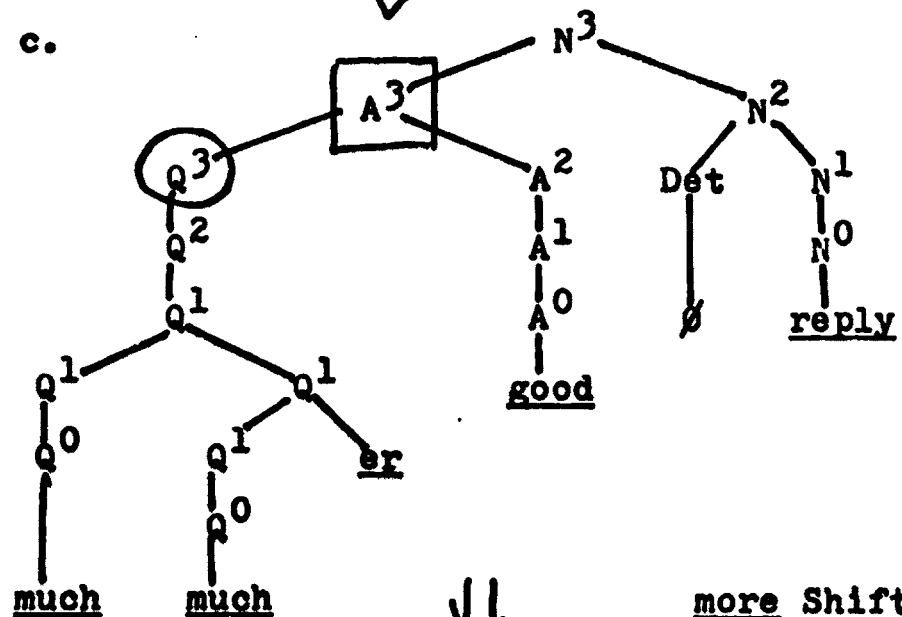
er Shift

b.



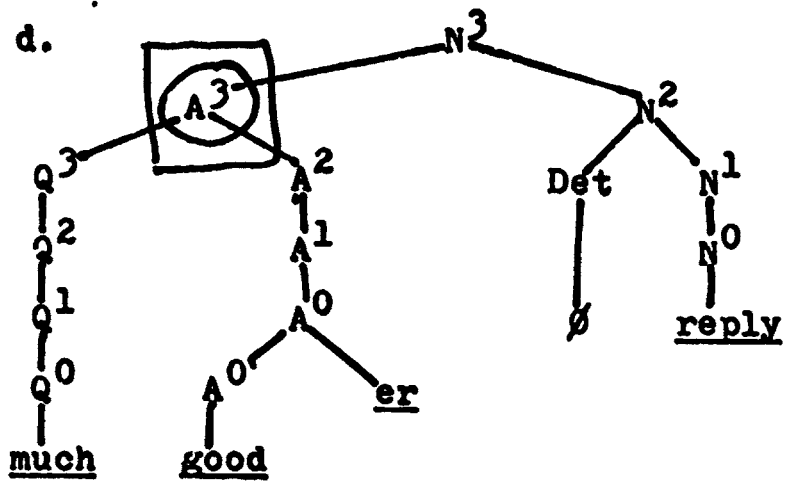
↓ x¹ Attachment

C.

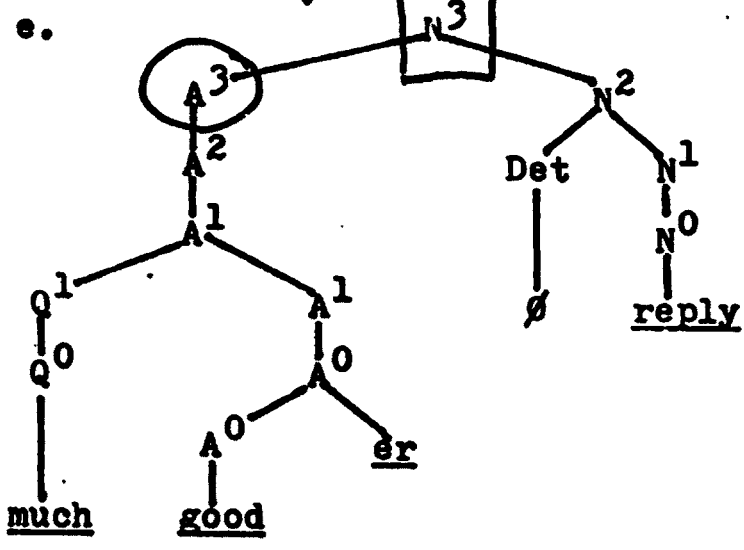


✓

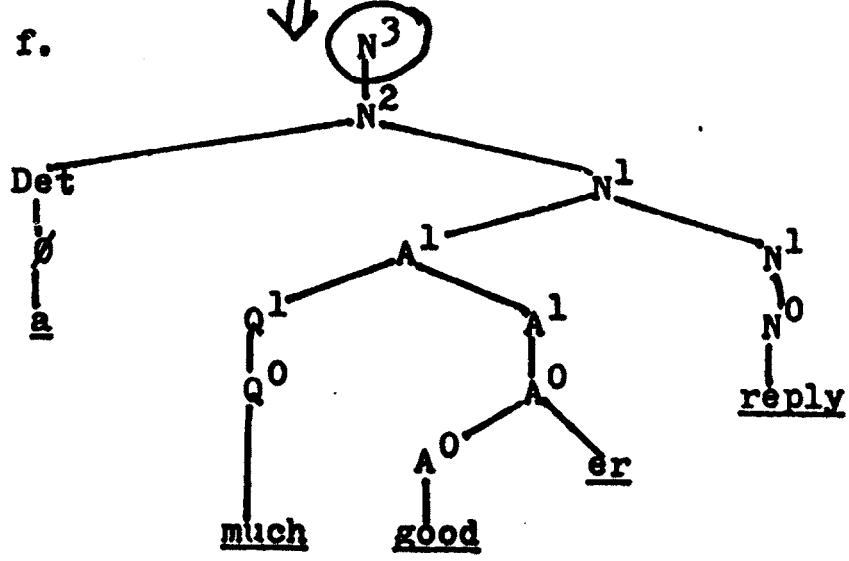
more Shift



$\Downarrow X^1$ Attachment



$\Downarrow X^1$ Attachment



Note that with regard to the A^3 cycle (stages c and d) the rules of more Shift and X^1 Attachment could be applied in the reverse order without aborting the derivation. Likewise the ordering with the $Q^0 A^0$ Filter and with much Deletion is immaterial.

The reader can easily verify that the rules will not derive (35b) from (38), but rather (38) will surface as (35a). Likewise, the rules can be seen to produce the correct results for paradigm (32). One aspect of the derivation (40) that may cause readers to balk is the $[_{Q^1} Q^1 Q^1]$ derived constituent structure in (40c). This is the structure which much more in a much more intelligent answer would have. This rather unnatural result will be eliminated in 2.1.3. For the present we may merely observe that it is produced by the metatheory.

The present system of rules may be summarized as follows:

- | | | | | |
|------|----|------------------------------|-----|----------------|
| (41) | a. | <u>er</u> Shift | OBL | (14) |
| | b. | X^1 Attachment | OBL | (39) |
| | c. | Indefinite Article Insertion | OBL | (unformulated) |
| | d. | <u>much</u> Deletion | OPT | (12) |
| | e. | $Q^0 A^0$ Filter | | (16) |
| | f. | <u>more</u> Shift | OBL | (18) |

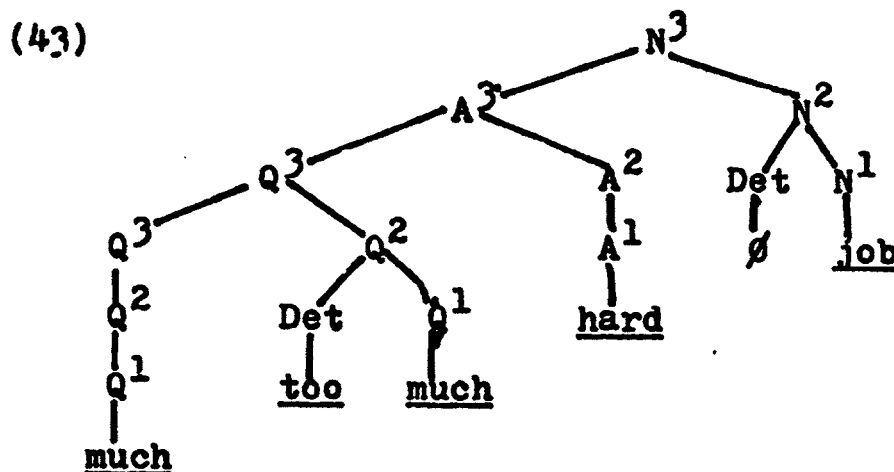
These rules are hopefully a minimum set for data like (10, 11, 32, 35), although some of the superscripts are doubtful.

X^1 Attachment automatically incorporates the special feature of QP Raising noted by Bresnan that it will not incorporate a QP into a QP whose Det is nonnull:

(42) a. much too hard a job

b. *a much too hard job.

(42a) will be underlain by (43):



On the two Q^3 cycles, nothing will happen: in particular X^1 Attachment will not apply on the second Q^3 cycle because of the degree particle too intervening between the two Q^1 nodes. Then on the A^3 cycle much Deletion will apply, but again X^1 Attachment will be blocked. Finally, X^1 Attachment will yet again be blocked on the N^3 cycle. Hence the formulation of X^1 Attachment determined by the simpler cases automatically extends to the case of (42).

I will now motivate an additional filter in the analysis. Consider (44–46):

(44) a. as good a linguist

b. *as good linguists

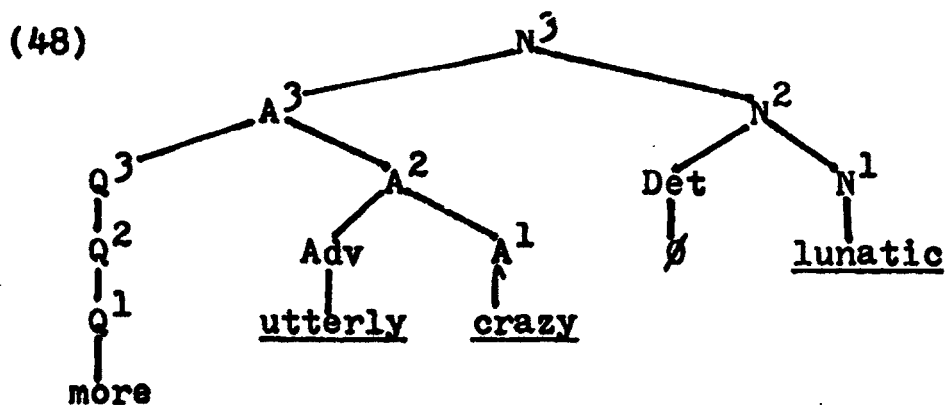
- (45) a. *as good linguists
b. better linguists
- (46) a. *as good beer
b. better beer

In precisely those examples where X^1 attachment will succeed in attaching A^1 to N^1 , thereby destroying A^3 and A^2 , the example is good. Otherwise, it is bad. We may suppose then that there is a filter following article insertion that prohibits $A^2 N^1$ (or equivalently, $A^3 N^1$) sequences. The formulations of the $*A^2 N^1$ filter and the article insertion rules are trivial.

We may now consider an apparent counterexample:

- (47) a more utterly crazy lunatic

By our rules the underlying structure for (47) would have to be (48):



The Adv utterly will block X^1 Attachment on its attempt to apply to the circled A^3 , so that *more utterly crazy a lunatic will be derived, and the grammatical form will not be. This is precisely consonant with the problem we noted in the preceding subsection of the grammaticality of too utterly crazy, in which much Deletion is applying

before utterly (recall too *(much) so, etc.).

I propose that in these examples utterly is an ordinary A rather than an Adv. (47) will not then have (48) as its structure, but will rather have a structure parallel to a more obviously crazy lunatic.

I now return to the cyclicity principle (29). Strict Cyclicity principles are characteristically thought of as prohibiting operations entirely within a domain dominated by a cyclic node. This leaves open the question of what happens if the cyclic node dominating a domain is removed. We can see that in the case of (29), the newly exposed material should not be resubmitted to rule application. Consider a much better linguist. This is derived from X^1 Attachment from much better a linguist. X^1 attachment removes the A^3 node from over much better, yet the $Q^0 A^0$ Filter does not get a chance to rule the sentence out on the N^3 cycle.

We can formalize (29) appropriately by introducing into a theory a division between red and green brackets. The base produces structures in which all the brackets are green. When the cycle on a domain is finished, all the brackets (including the outermost) on that domain are painted red. (29) then becomes a constraint that one of the factors covered by a constant term in a rule must contain green brackets in order for the structural description of the rule to be met. I believe that this formalism could be extended to the treatment of idioms

given by Kiparsky (1975).

We are finally left with the problem of the indefinite article. The following data can be taken to support either a rule of one(s) Deletion or a rule of one(s) Insertion (I am indebted to Hankamer for pointing this out to me):

- (49) a. I wrecked Bill's old car, and you wrecked
Harry's new *(one)
- b. I wrecked Bill's car, and you wrecked
Harry's (*one)
- (50) a. I bought three old records, and you bought
three new *(ones)
- b. I bought three records, and you bought four
(*ones).

We could say that one(s) is deleted after quantifiers and possessives, or inserted after adjectives (but note this one and that one: I suspect that this is a different one)

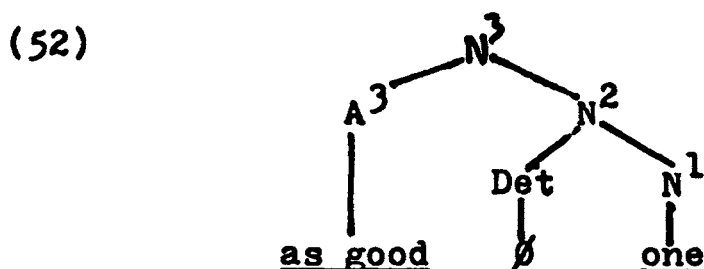
Observe the following contrast:

- (51) a. Bill is a piano player and Lucinda is one too
- b. Bill is as good a piano player as Dinu
Lapitti, and Lucinda is as good a one as
Horowitz.

(Perlmutter 1970) suggests that the indefinite article is a stressless form of the numeral one, and that there is deletion of the identity-of-sense pronoun one after numerals, including the indefinite article. Hence the preducat nominal one in (51a) is analysed as underlyingly one one, with the second one disappearing by one(s) Deletion.

But this approach cannot explain the appearance of

a one in (51b). Even if the a were underlying empty, so that we had a structure like (52)



a one(s) Deletion rule would still apply, providing that the null Det were of the same grammatical category as a numeral, since terms of transformations can take null factors.

But suppose instead that one(s) is inserted, presumably for an empty N^0 . We might formulate the rule as follows:

(53) one(s) Insertion

$$\begin{array}{ccc}
 A^3 & - & N^0 \\
 1 & & 2 \\
 1 & & \text{PRO}
 \end{array}
 \begin{array}{c}
 \text{OBL} \\
 \Rightarrow
 \end{array}$$

Then the appearance of ones in (51b) is explained, as long as one(s) Insertion follows Indefinite Article Insertion.

I have formulated the rule as insertion of PRO rather than as insertion of one(s) because I wish to preserve the solution proposed in (Andrews 1974) to the problem presented in (54):

- (54) a. I ate Bill's meat and you ate Mary's
 b. *I ate Bill's expensive meat and you ate Mary's cheap ??

Then the N^0 for which one would substitute one(s) is mass, nothing can be done. I proposed that one(s) was inserted

by surface structure lexicalization for a feature complex, and that there simply wasn't a lexical item that could be inserted for the mass counterpart to one(s). Derivations surfacing with unlexicalizable positions would then block. Thus if (53) inserts PRO into an N^0 that is [-count], there is no lexical item that can fill this position, and the derivation blocks, explaining the ungrammaticality of (54b).

We finally want a principle to force the indefinite article to be underlyingly null. I propose the principle that if an N^3 is analysable as $A^3 N^2$, it is also analysable as $A^3 N^1$. One would hope to derive this principle from more general considerations, presumably of semantic interpretation.

2.1.3. So and Such: Bresnan (section 1.4.) observes a mass of facts which support the notion that the AP Shift process is capable of moving an AP while stranding an associated so, which subsequently becomes such:

- (55) a. so tall a man
- b. *so a tall man
- c. *such tall a man
- d. such a tall man

Observing in addition the following data:

- (56) a. so much better a linguist
- b. *such a (much) better linguist

we are led to propose the following reformulation of X^1 Attachment that will accommodate the above data:

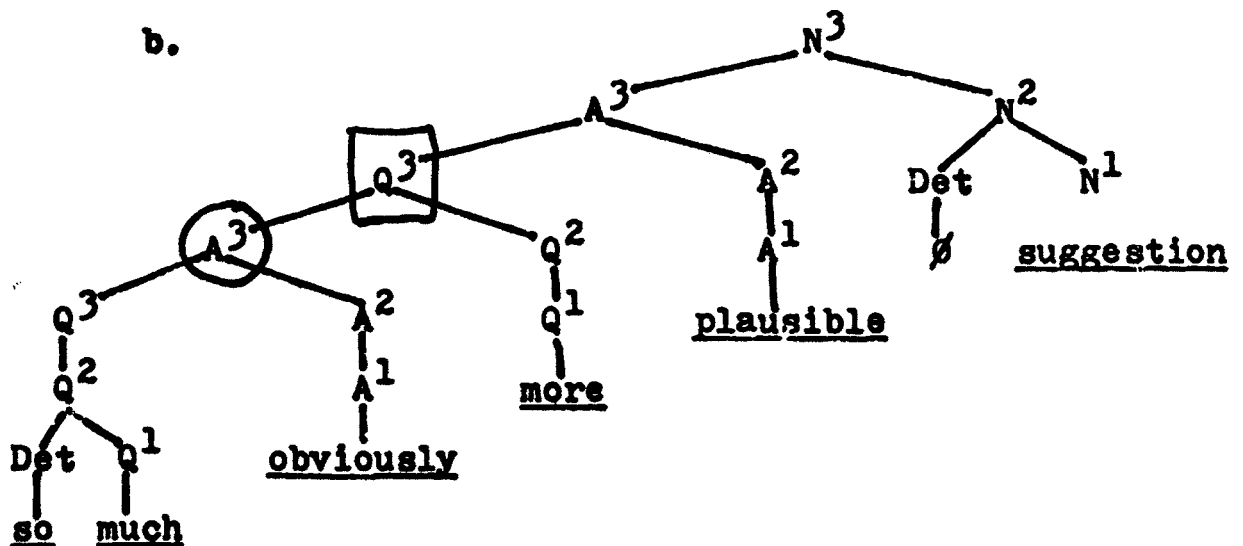
$$(57) \begin{array}{ccccc} [Y^3 <\underline{so}>_1 - \left[\begin{array}{c} X \\ <+A>_1 \end{array} \right]^1 - Y^1] <\underline{OPT}>_1 \\ \begin{array}{ccccc} 1 & 2 & 3 & & \\ 1 & \emptyset & 2\#3 & & \end{array} \end{array}$$

In interpreting this rule, we can take OPT as a feature or as a non-feature with regard to the angle bracket notation. If we take it as a non-feature, we want rules with no specification to be obligatory; if we take it as a feature, we want $[-OPT] = OBL$. The rule has an equally highly valued equivalent in which the role of '+A' is filled by '-Q.'

(57) is, I believe, the minimal rule for the data we have seen so far, but it is in fact incorrect, going badly haywire in some rather intricate derivations. Consider (58b), the underlying structure of (58a):

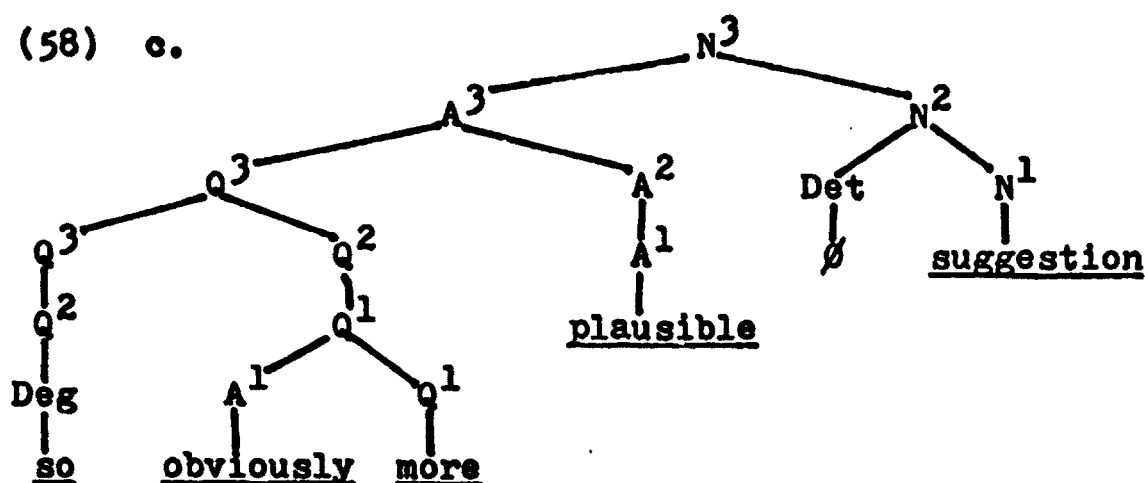
(58) a. such an obviously more plausible suggestion

b.



On the (A^3) cycle, much Deletion will happen. On the $[Q^3]$ cycle, obviously and more will glom together under Q^1 , resulting in the derived constituent structure (58c):

(58) c.



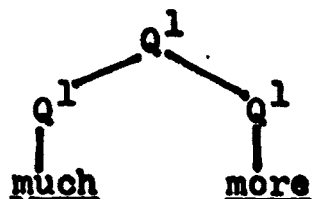
But now we are stuck. To get to a stage where we can shift obviously more plausible into the N^2 , we have to attach the Q^1 obviously more to the A^1 plausible, and this operation is prohibited by the formulation of (57).

This formulation is necessary in order to avoid generating *(56b) from (56a). To avoid the generation of *(56b) we must block incorporation of a Q^1 that is preceded by so into an A^1 , and that is precisely what we must do in order to progress from (58b) to the grammatical (58a).

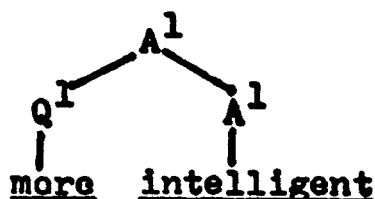
It is not sufficient to merely change (57): rather, we must alter the metatheory so that it is not in fact compatible with the data of the preceding section and that of (55-56).

The rule of X^1 Attachment produces derived constituent structures such as (59), which have doubtless upset many readers when they have occurred in our derivations:

(59) a.



b.



These structures have the property that the basic modifier-head relationships have been obscured. Let us then add to the metatheory a stipulation that structures of the form (60) cannot be produced by a transformation:

(60)



(were, of course, any of X, Y and Z many be equal to one another). We might accomplish this with a restriction that structures of the form (60) are obligatorily interpreted as coordinate structures.

The rule of X^1 Attachment (39) is no longer compatible with the data (32, 32), since it assigns to these sentence impossible derived constituent structures. I believe that instead the minimal rule is (61):

(61) X^2 Attachment (first try):

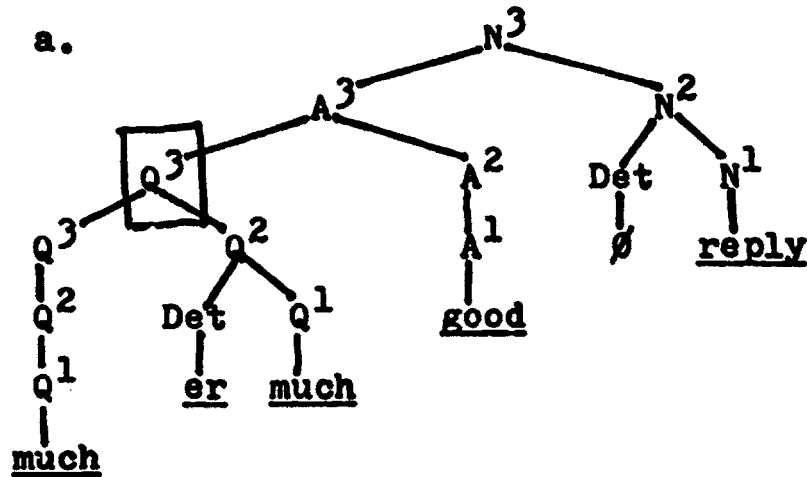
$$\begin{array}{ccc}
 [Y^3 [X^2 X^1] - Y^1] & & \\
 \begin{array}{cc} 1 & 2 \end{array} & & \text{OBL} \\
 \emptyset & 1\#2 & \Rightarrow
 \end{array}$$

X^2 Attachment, like X^1 Attachment, produces the additional facts of (42), as desired. We have thus not lost

explanatory potency in this direction. We also, however, have attained intuitively far more comfortable derived constituent structures.

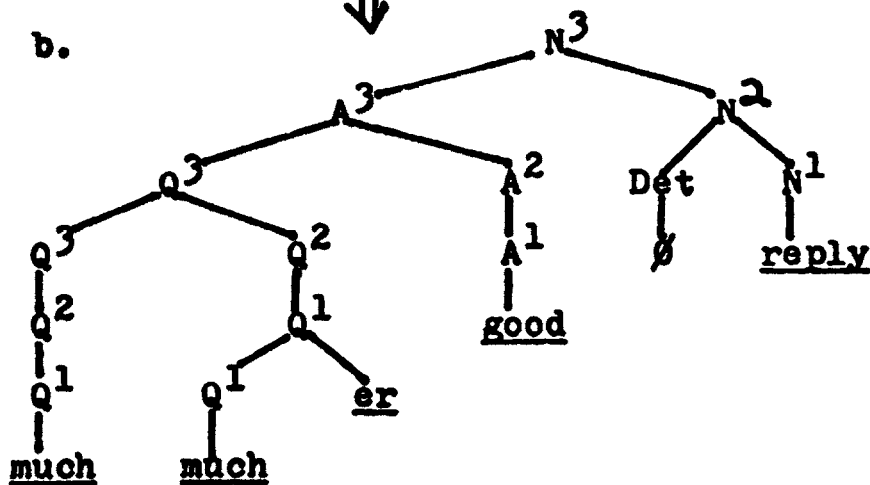
The derivation of a much better reply goes through as follows:

(62) a.

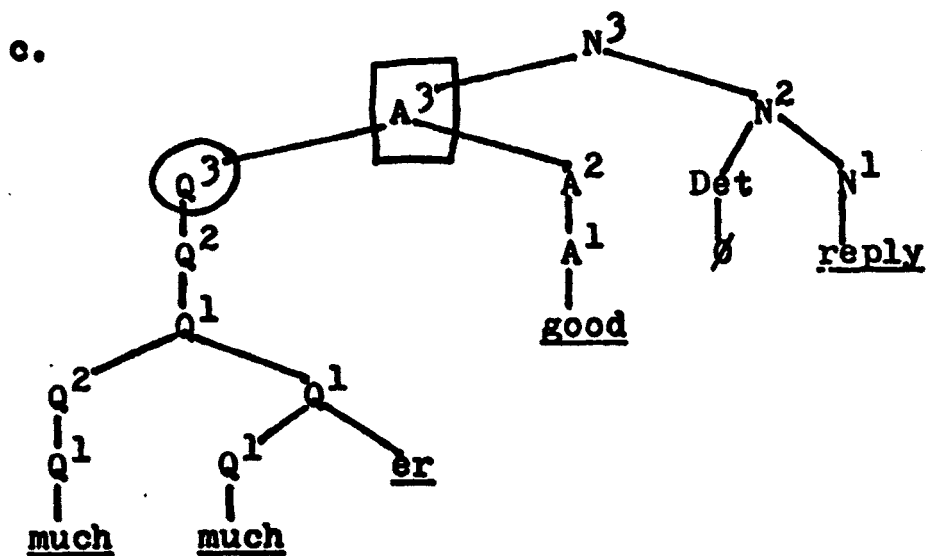


\Downarrow er Shift

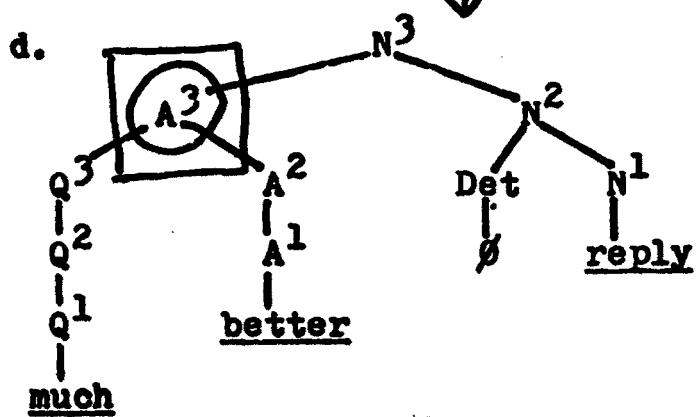
b.



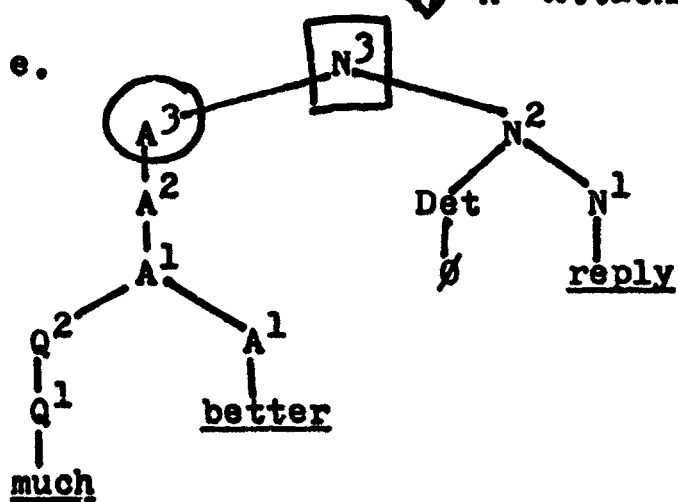
\Downarrow x^2 Attachment



⇓ more Shift

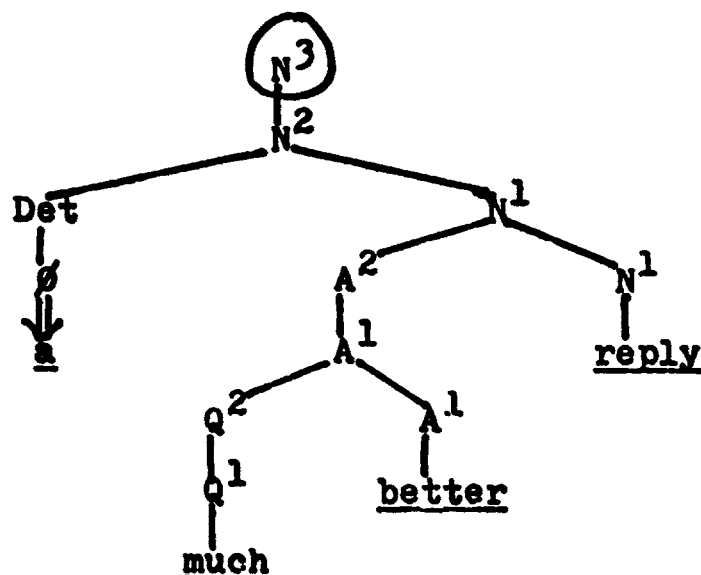


⇓ x^2 Attachment



⇓ x^2 Attachment

f.

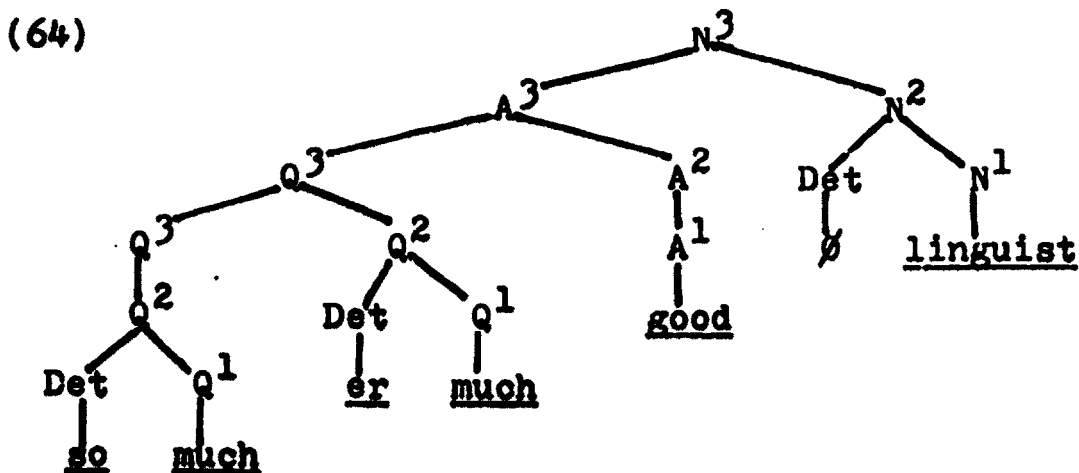


Now let us return to the data of (55). Given the revised metatheory and the data of the preceding sections, the minimal way to accomodate (55) is to reformulate x^2 Attachment as follows:

(63) x^2 Attachment (second try):

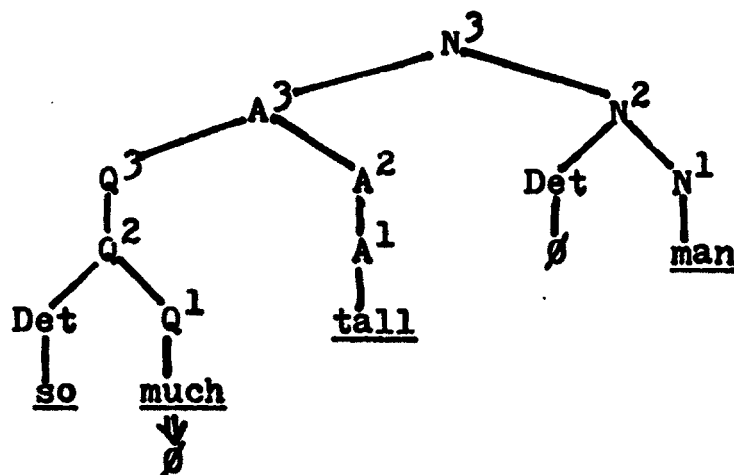
$$\begin{array}{ccccccc}
 [Y^3 \langle \underline{so} \rangle_1] & - & [x^2 x^1] & - & y^1 & & \langle \text{OPT} \rangle_1 \\
 1 & & 2 & & 3 & & \Rightarrow \\
 1 & & \emptyset & & 2\#3 & &
 \end{array}$$

Now (63), unlike (57), automatically predicts the facts of (56b). The underlying structure of (56a) will be (64):



But (64) will never meet the structural description of the new X^2 Attachment, so that the derivation to *(56b) will be blocked. The reason the rule does not get to apply to (64) is that the initial so is under the Q^2 of the Q^1 that immediately follows it; while in (65), the underlying structure of (55a), that Q^1 gets deleted on the A^3 cycle, leaving so preceeding A^2 on the N^3 cycle, so that (63) can apply:

(65)



Going back to the example (58), which defeated the original X^1 Attachment rule, we find that the derivation by X^2 Attachment does not get hung up. On the A^3 cycle much disappears, then X^2 Attachment works smoothly on each following cycle.

The metatheoretical principle ruling out structures of the form (60) thus results in very substantial explanatory improvements: from the data of (55) are predicted both the data of (56) and (58). The principle has the added appeal of ruling out a constituent structure that is counterintuitive, to say the least.

We may note a pleasant by-product of the reformulation

of the attachment rule: the filter to exclude *as good beer receives unique characterization as an $A^3 N^1$ filter.

This is, of course, free beer rather than an argument.

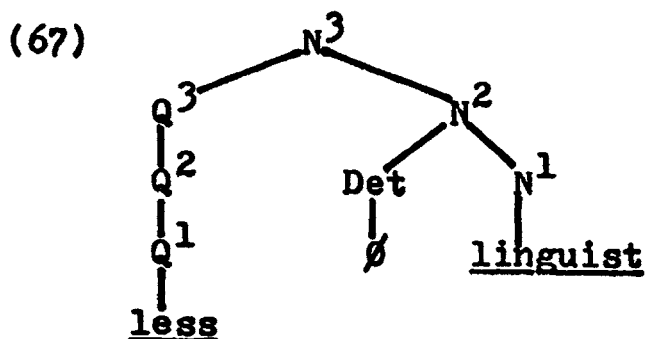
We must finally extend the analysis in order to accommodate a few more facts brought forth by Bresnan.

Consider such examples as the following:

- (66) a. Bill is less a linguist than you are
 b. Ferdinand is too much a scholar to publish junk like that
 c. he has become more a poet than a linguist.

Bresnan assigns to less a linguist the structure

(67) (after er Shift):



I would be inclined to have the Q^3 immediately dominated by A^3 . This would capture the intuitive resemblance of these structures to the predeterminer adjective constructions, and explain less a one by one(s) Insertion, and *this is less beer than that by the $A^3 N^1$ filter.

Regardless of whether we make these emendations, rule (63) will misapply to (67), deriving *a less linguist. Hence (63) must be again reformulated. (68) appears to do the job:

(68) x^2 Attachment (final version):

$$\begin{array}{ccccccc}
 [Y^3 \langle \underline{so} \rangle_1] & - & [X^2 [\langle \overset{x}{Q} \rangle_2]^1] & - & [\langle \overset{y}{-N} \rangle_2]^1 & \langle \text{OPT} \rangle_1 \\
 1 & & 2 & & 3 & \\
 1 & & \emptyset & & 2\#3 &
 \end{array}$$

Note how crucially this formulation relies on the differing interpretation of angle brackets around features (as in term 2) and around nonfeatures (terms 1 and 3), as specified in Sound Patterns of English (pg. 394-395). Also note that (68) merely describes, rather than explains, 66.

I list the salient rules in the analysis we have arrived at as follows:

- | | | | |
|---------|----------------------|-----|----------------|
| (69) a. | <u>er</u> Shift | OBL | (14) |
| b. | x^2 Attachment | OBL | (68) |
| c. | Ind. Art. Insertion | OBL | (unformulated) |
| d. | $*A^2 N^1$ Filter | | (unformulated) |
| e. | <u>much</u> Deletion | OPT | (12) |
| f. | $*Q^0 A^0$ Filter | | (16) |
| g. | <u>more</u> Shift | OBL | (18) |

There are various further data and constructions considered in Bresnan (1.5.-1.6.). The reader can verify that under Bresnan's account of the underlying structures, the rules of (69) work correctly. They also apply appropriately to the indefinite superlative construction of Bresnan (1.7.).

2.1.4. The Indefinite Comparative: The indefinite comparative is the structure exemplified in the following examples:

- (70) a. The more you work, the less you get
 b. The taller you are, the heavier
 c. The more pizzas Mary eats, the fatter she gets.

My own work on these constructions is a reanalysis of material covered in (Thiersch 1974). I will here consider the internal constituent structure of the preposed constituents in the: the more pizza and the fatter in (70c), for example. The clausal relations will be discussed in 2.2.1., though it should be obvious that I am going to say that the initial clause is an anticipatory clause like the anticipatory relatives of the preceding chapter.

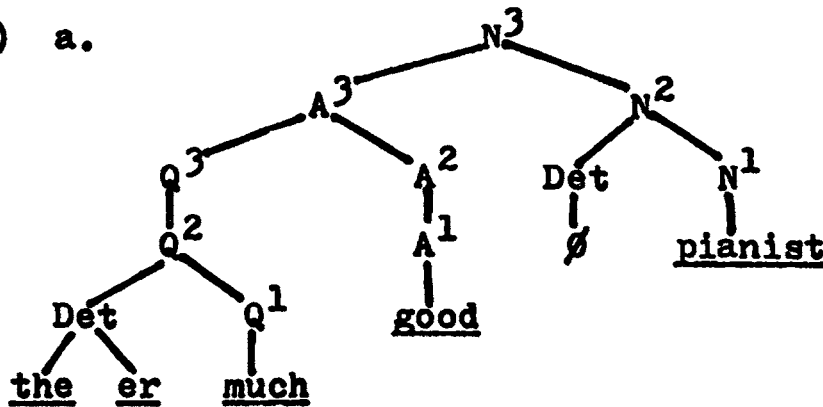
The problem is to determine the underlying constituent of the the. Thiersch analyses it as a COMP, occurring initially in each clause, which attracts the constituent with more to it. The following examples, however, suggests that it is instead an occupant of the Det of QP:

- (71) a. the more you practice, the better a pianist
 you will be
 b. the better a linguist you are, the
 questions you have to ask your informants.

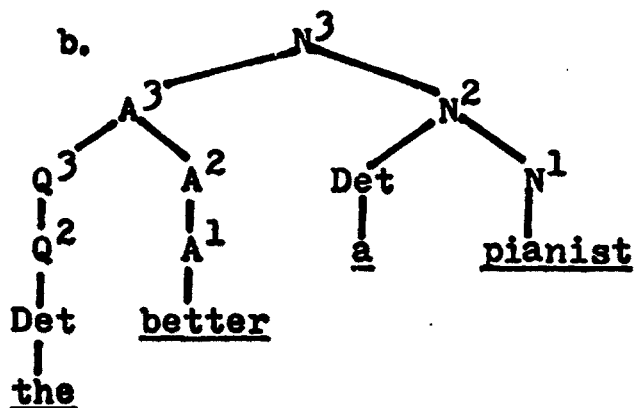
Consider the phrases the better a pianist, the better a linguist. If the the is in COMP, nothing can explain the ungrammaticality of *the a better linguist, *the a better pianist, *the a more obviously competent insurance

salesman, etc. But suppose the is in the Det of QP. Then the better a pianist will have the underlying structure (72a), reaching the surface as (72b):

(72) a.



b.



The Q^3 remnant the prevents x^2 Attachment from applying on the N^3 cycle.

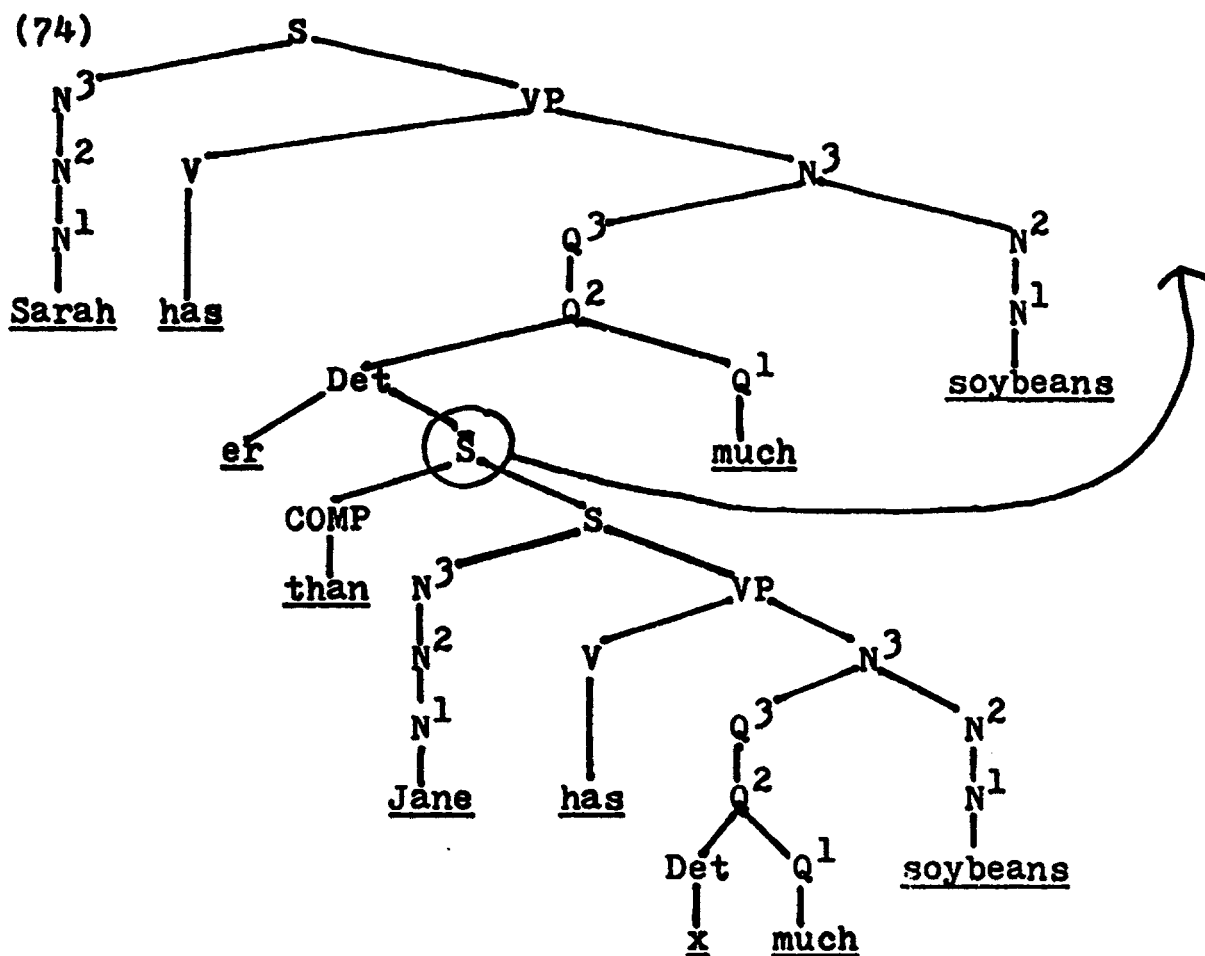
This analysis further confirmed when we see such examples as he tried all the harder, so much the worse for him, he became all the better a psychologist for it. In these cases the the is preceded by predeterminer material, though it is not in the indefinite comparative construction.

This little studied construction thus fits easily into Bresnan's analysis.

2.2. Comparative Clauses in the Base: I will here determine the underlying position of comparative clauses. In

2.2.1. I examine and reject the traditional view that comparative clauses are generated in the Det of the QP they modify. In section 2.2.2. I propose that comparative clauses (including the indefinite comparatives of (2.1.4) are generated in the base in the positions that they occupy on the surface, and indicate what the responsible rules are.

2.2.1. The Determiner Analysis: Bresnan (pp. 338-343) proposes the traditional analysis of the underlying structure of comparative clauses, in which they are generated within the Det of the QP they modify, and are then moved to their surface position by rules of Comparative Formation and Extraposition. Hence (73) is underlain by (74), which undergoes the movement indicated by the arrow, as well as deletion of a constituent identical to the head except for its special Determiner x in the QP (x is the symbol for the Det of the 'target QP' of the comparative clause rather than a logical variable):



Bresnan cites two motivations supporting this structure. The first is that the cooccurrence restrictions between the COMP of the comparative clause and the Det of the modified QP may easily stated over these structures. Bresnan observes that these restrictions hold over unbounded distances in surface structure (Bresnan pg. 339):

- (75) a. Mary doesn't have as many too many too many
... marbles as Jance
- b. Cindy has more nearly as many too many
marbles as Julie than Linda

The second reason is that this structure allows a systematic explanation for the exclusion from the

comparative clause of certain modifiers in the head, namely, those that precede the determiner with which the clause is associated. Consider, for example, (76):

(76) Melvin sliced twice as many bagels as Seymour
We wish (76) to be derived from (77) rather than from (78):

(77) Melvin sliced twice as [Seymour sliced x many
bagels] many bagels

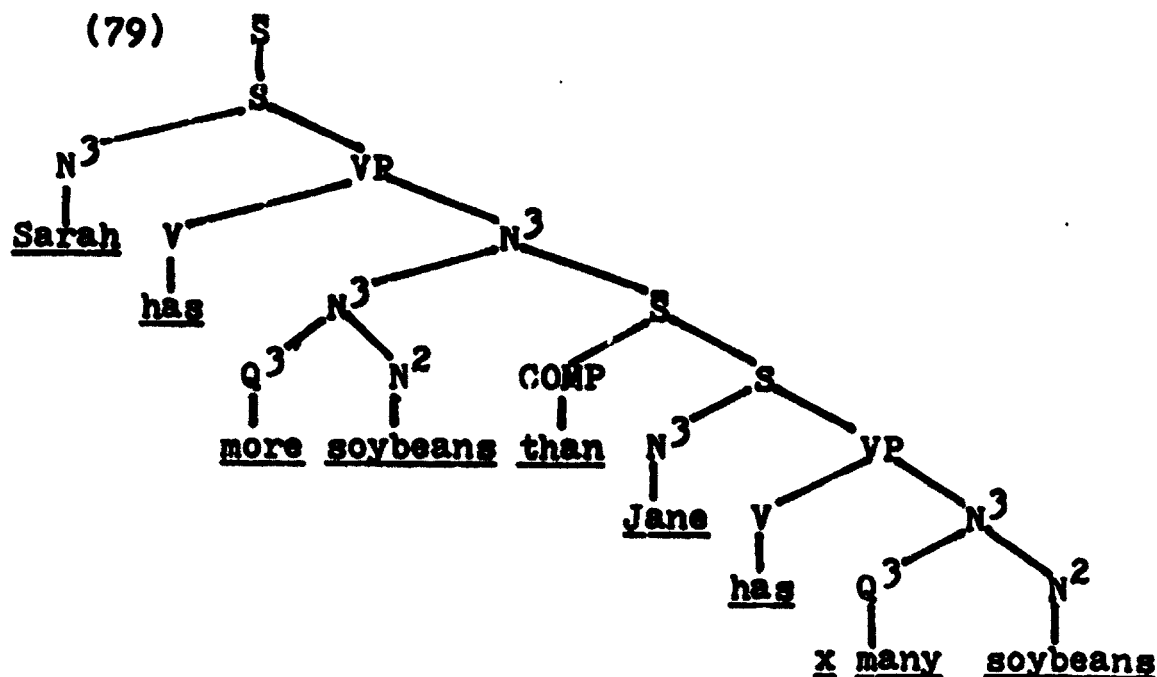
(78) Melvin sliced twice as [Seymour sliced twice
x many bagels] many bagels

Given determiner generation of the comparative clause, the modifiers that are excluded are given a straightforward characterization as those that are to the right of the clause itself in its underlying position.

To these considerations may be added a third, the support of semantic interpretation. The semantics of comparatives will obviously go more smoothly if there is some systematic representation of the relations between a comparative clause and the QP it modifies. Davis and Hellan (in preparation), for example, give a model theoretic semantics for comparatives that is based essentially on Bresnan's analysis, and assumes that the comparative clause is generated in the determiner.

There are nonetheless many severe problems with determiner generation of comparative clauses. First, there are difficulties connected with formulating the rule.

The presumed derived constituent structure from the application of Comparative Formation to (74) is (79):



Bresnan suggests that Comparative Formation also effects deletion of the constituent x many soybeans in the comparative clause that is identical to the head (when the clause has been removed. I have omitted this feature in (79).

If (79) is the derived constituent structure produced by Comparative Formation, then the rule has to have the effect of Chomsky adjoining the comparative clause to its head, which is an operation of Chomsky adjoining a constituent to a containing constituent (and deleting the original occurrence within that constituent). Because the rule requires operations (deletion and adjunction) on overlapping domains, it is not formulable as a single transformation within the framework of Peters and Ritchie (1973) (c.f. Peters

and Ritchie pg. 54, pg. 60 def. 210). I do not think one could easily introduce the capacity to perform such operations either into the Peters and Ritchie framework or the Partee and Ginsburg (1969) framework. One could probably find a way by factoring Comparative Formation into two successive operations, an adjunction and an erasure, but my best efforts in this direction are hardly attractive. The rule is thus unformulable as a single transformation in available formalisms, and the necessity for factoring it into two transformations considerably increases its cost and lowers its appeal.

Additional problems arise when we attempt to specify where Comparative Formation is to put the clause it moves. Bresnan (pp. 328-329) notes paradigms such as the following:

- (80) a. Bill is more than five feet tall
- b. Bill is taller than five feet
- c. *Bill is more than Max (is) tall
- d. Bill is taller than Max (is)

She shows that the correct phrasing for the AP of (4a) is is (more (than five feet)) tall, and proposes that the comparative clause originates from an underlying equational sentence 'five feet is x much.' She claims that the verb of this sentence cannot be the copula, but must be a special abstract equational predicate, but the basis for this is not clear to me. The copula would appear to suffice in the light of such examples as

five feet is more than six inches, etc..

We can thus propose (81) to underly (80):

- (81) a. Bill is er [than five feet is x much] much tall
 b. Bill is er [than five feet is x much tall]
 much tall
 c. Bill is er [than Max is x much] much tall
 d. Bill is er [than Max is x much tall] much tall.

The comparative clause may in these examples be seen to be attaching to that constituent in the head which is identical to the disappearing constituent in the comparative clause. (80c) is ungrammatical because putting the comparative clause after er much forces the deleted constituent in the comparative clause to be x much, which cannot be equated with Bill.

This sort of approach too breaks down because of examples like the following:

- (82) a. Bill sliced more salami than Harry did
 bologna.
 b. the table is longer than the door is wide
 c. more men than women (did) made reservations
 d. he gave more cash than he did attention
 to his mistress

The sources for these would be (84):

- (83) a. Bill sliced er [than Harry sliced x much
 bologna] much bologna
 b. the table is er [than the door is x much wide]
 much long
 c. er [than x many men made reservations] many
 women made reservations

- d. he gave er [than he gave x much attention] much cash to his mistress.

No condition on Comparative Formation stated in terms of identity can generate (82) but block (84):

- (84) a. *Bill sliced more than Harry did bologna salami
 b. *the table is more than the door is wide long
 c. *more than women did men made reservations
 d. *he gave more than he did attention cash to his mistress.

Bresnan notes these problems, but does not give a clear solution.

The situation gets worse if we observe some restrictions found by (Pinkham 1974). Pinkham noted that when a comparative clause was attached to its head, rather than extraposed, and neither contained a structure identical to the head nor was identical outside the head to the matrix, then the sentence was ungrammatical. Corresponding to the grammatical (82c, d) are the grammatical (85a, b) and the ungrammatical (86a, b):

- (85) a. more men than I expected to made reservations
 b. Bill gave more cash than Maurice did to Brycelinde
- (86) a. *more men than I expected women to made reservations
 b. *Bill gave more cash than Maurice did affection to Brycelinde.

Conditions on a movement rule would appear to be an unlikely way to explain what comparative clauses go where.

Attempts to maintain a determiner source for comparative clauses are finally defeated by multiple headed comparatives like these:

(87) ~ as fair a woman and as foul a man as I have ever seen together are coming toward us

(88) a.² people do crazier things at higher speeds on the McGrath Highway than they do other places

b. Marcille gave a longer talk at a better attended session than did her husband

c. Alfred bestowed a heartier kiss on a prettier girl than Maxwell did.

(Lieberman 1974) also cites multiple headed result clauses:
John hit his car so hard so many times with such a big hammer that it finally started.

(87) would presumably be underlain by (89), and (88) by (90):

(89) as much fair a woman and as much foul a man
 [as I have ever seen x much fair a woman and
 x much foul a man together] are coming
 toward us

(90) Alfred bestowed er much hearty a kiss on er much
 pretty a girl [than Maxwell bestowed x much
 hearty a kill on x much pretty a girl]

The other examples of (88) have structure paralell to (90). Note that the 'x' in these examples is not a logical variable, but a symbol for the abstract formative (so?) that is the Det of the QP in the comparative clause.

One might think to generate (87) by generating a comparative clause in each conjunct of the coordinate NP, and applying Right Node Raising, but the presence of together renders this impossible: I have ever seen

x much fair a woman together is ungrammatical. This result is preserved under current theories in which many aspects of semantic interpretation are determined from surface structure, because in these theories Right Node Raising would have the comparative clause binding traces in each conjunct, and interpretation would use these to determine the meaning as if the movement had not occurred (see Vergnaud 1974, pp. 82-83 for discussion). We get the same result in (88) there aren't any processes that could yield the comparative clause by combining well-formed clauses on the individual matrix comparative determiners.

(87-88) might be dismissed as marginal phenomena. If they were the sole evidence against Comparative Formation one might still maintain the rule with a relatively clear conscience. But in the light of the preceding discussion, which shows that the formulation of the rule is highly problematic, if possible at all, they become telling counterevidence.

There is a final consideration that we must discuss before accepting (87-88) as counterevidence to Comparative Formation. There are sentences in natural language which 'sound all right' and suggest a meaning, but certainly don't get their meaning by means of regular rules of grammar. For example, "the more you eat the more you want the more you eat" suggests the presence of a vicious circle, but it certainly doesn't do this by means of regular rules

of semantic interpretation. Rather the meaning is delivered iconically, by an operation of free intelligence. One might correspondingly claim that (87, 88) were not sentences of English, but rather surface patterns resembling sentences, and receiving meanings not by regular rules but by some vague sort of suggestiveness.

The only way to refute such a proposal is to give rules for interpreting multiple headed comparatives, and show that they fit in reasonably well with the rest of the rules of semantic interpretation of the language. The semantics of comparatives is quite complicated, and that of multiple headed comparatives much more so. I wish to spare the reader most of my presently rather ill thought out ideas on the subject. I will, however, bring forth some reasons to believe that multiple headed comparatives are interpreted in a reasonably disciplined fashion.

(Postal 1974) suggested a semantics for comparatives in which they were interpreted as two definite descriptions connected by a relational predicate. Hence "Bill has more money than Tom" comes out "the amount of money Bill has exceeds the amount of money Tom has." Now consider an experiment on the effects of marijuana smoking. We may say "50 people smoked 100 joints" and mean either 50 people smoked 100 joints apiece, or 50 people smoked 100 joints between them (there are other readings, but they are not very sensible in the given context). Now suppose we say "more people smoked more joints in

this experiment than in the last." We might mean that the total number of participants in this experiment exceeded that in the last and the total number of joints smoked in this experiment exceeded that in the last, or we might mean that more people participated and they each smoked more joints.

We can get this effect by introducing a definite description operator that denotes not an amount, but rather an ordered pair of amounts, and likewise extending the 'exceeds' relation and the others to be relations over ordered n -tuples rather than merely individuals. Our example would thus have a logical structure like (9):

- (91) $(A X, Y)(X \text{ people smoked } Y \text{ joints in this experiment})$
 exceeds $(A X, Y)(X \text{ people smoked } Y \text{ joints in}$
 the last experiment).

'A' is the operator forming definite descriptions of amounts or n -tuples of amounts. I would interpret 'exceeds' in ' (x_1, \dots, x_n) exceeds (y_1, \dots, y_n) ' as meaning that for $i = 1, \dots, n$, x_i exceeds y_i , but one might dissent from this. The ambiguity in the example thus derives from the ambiguity of 'X people smoked Y joints,' which ambiguity would presumably be eliminated in a reasonable semantic representation. There is much more to be said on the subject of multiple headed comparative semantics, but I shall not try to say it here.

The above discussion, though incomplete, suffices to show that structures like (87-88) are really sentences. Their status as evidence is thereby confirmed.

2.2.2. The Base Position of Comparative Clauses: The comparative clauses that we have seen, including the double headed ones, come in two surface positions: attached to a head, and extraposed. I shall propose underlying structures for both in which the deep position is also the surface position. After examining the regular comparatives, I will turn to the indefinite comparatives.

The crucial fact about headed comparatives is that they can stack, and there is a constraint, which I call the mirror-image constraint, that the clauses must appear in the reverse order from that of the determiners of the QP that they are associated with:

- (92) a. as many more people than I invited as you
predicted came to the party
- b. *as many more people as you predicted than I
invited came to the party.

Since they stack, I shall presume that they are introduced by the rule $X^3 \rightarrow X^3 S$. When $X = N$, we get examples like (92), when $X = A$ we get sentences like the chair is twice as much wider than the door as I expected, and when $X = Q$ we get those like the plants grow as much as six feet high.

Extraposed comparatives also appear to stack, and to obey the mirror-image constraint, even in conjunction with embedded comparatives:

- (93) a. as many more people than I invited came to
the party as you predicted

- b. *as many more people as you predicted came to the party than I invited
- c. as many more people came to the party than I invited as you predicted
- d. *as many more people came to the party as I invited than you predicted.

From analogy with relative clauses, it would be reasonable to propose that extraposed comparatives be introduced by the $S \rightarrow S \bar{S}$ rule that introduces extraposed relatives.

This rule leads us to expect to find comparative clauses with a head in each conjunct of a coordinate S , but not of a coordinate \bar{S} :

- (94) a. more men were singing and more women were dancing than I had ever seen on a stage at once
- b. Bill reported that more men wer singing and (*that) more women were dancing than he had ever seen on a stage at once
- c. than I/he had ever seen x many men and x many women on a stage at once.

(94a) illustrates the construction, (94b) shows that a comparative clause cannot be attached to conjoined \bar{S} , and (94c) shows the presumed underlying structure for the comparative clauses in these examples.

We see that an extraposed comparative can precede or follow an extraposed relative, and that the mirror-image constraint appears to hold:

- (95) a. more men came to the party who were drunk than I expected would
- b. *more men came to the party than I expected would who were drunk
- c. more men picked a girl up who was willing

than we expected

- d. *more men picked a girl up than we expected
who was willing

These facts strengthen the hypothesis.

Williams (1974) proposed that comparative and result clauses extraposed to the end of the S that was their scope. Consider such examples as these:

- (96) a. Bill's teachers said he was so smart he
could solve any problem
- b. Bill's teachers said he was smarter than
anybody else was
- c. Bill's teachers said he was so smart that
people doubted their rec endations
- d. Bill's teachers said he was smarter than
anybody else did

In (96a, b) the scope of the comparative or result clause is the complement sentence: in (96a) Bill's problem solving ability is said to be a consequence of how smart he is, not how smart people say he is, and in (96b) Bill is said to be smarter than anybody else. In (96c, d) however the scope of the comparative and result clauses is the matrix: in (96c) it is the extent to which Bill's teachers say he is smart that causes disbelief, and in (96d) the extent to which Bill's teachers say he is smart is compared with the extent to which anybody else does.

Williams claims that these scope differences correspond to differences in surface constituent structure as follows:

- (97) a. Bill's teachers said [he was so smart he could solve any problem]
- b. Bill's teachers said [he was smarter than anybody else was]
- c. [Bill's teachers said that he was so smart] that people doubted their recommendations
- d. [Bill's teachers said he was smarter] than anybody else did.

This claim is supported by the following contrasts involving the placement of matrix agent phrases:

- (98) a. *Bill is said to be so smart by his teachers that he can solve any problem
- b. *Bill is said to know more by his teachers than anybody else does
- c. Bill was said to be so smart by his teachers that people doubted their recommendations
- d. Bill was said to be smarter by his teachers than he was by anybody else.

When the clause has scope within the complement, the matrix agent phrase cannot be interpolated between it and its head. Assuming that nodes cannot be moved into S by the rules that position adverbs or prepositional phrases, the result follows immediately from the bracketing of (97).

We can see that the clause may be indefinitely far removed from its head by contemplating examples such as Bill is said by his friends.....to be believed by his teachers to be smarter than anybody else is, etc.

We can produce multiple headed examples precisely parallel to (98):

- (99) a. *people are said to do crazier things at higher speeds there by Dorothy than they do other places
- b. *people are said to do such crazy things at such high speeds there by Dorothy that they get killed off in droves
- c. people are said to do crazier things at higher speeds there by Dorothy than they are by other people
- c. people are said to do such crazy things at such high speeds there by Dorothy that I am getting skeptical.

It cannot be maintained, then, that comparative and result clauses are extraposed to the end of the S that is their scope. Rather they are base-generated in approximately that area. I propose that they are base-generated as sisters to the S that is their scope.

Notice that we have here rather massive Right-Roof Constraint violations (assuming that the connections between the clauses and their heads obey island constraints), but that the sentential subject constraint is respected: *that Seymour sliced so many bagels is obvious that his arm fell off. These results strengthen the suspicion voiced in section 1.1.3.6. that the Right Roof Constraint should be retired.

The question arises naturally whether certain clauses just happen to be generated in a clause-final position, or whether there is a general prohibition on rules of extraposition. We have only seen two purported varieties of clausal extraposition: extraposition of comparative and result clauses, and extraposition of

relative clauses. There have also been purported to be extraposition of noun-complement clauses (Bill figured a proof out that the circle could not be squared) and extraposition leaving it (it is obvious that Jack is a commie). I cannot replicate any of the arguments that relative and comparative clauses are generated in place for these other types.

Furthermore there is a paradigm discovered by Ross that there is extraposition of relative and complement clauses from NP that have been wh Moved to initial position (adapted from (Ross 1967:5.1.1.3))

- (100) a. Sam picked somebody up who would sleep
with him before nine
- b. Sam picked somebody up before nine who would
sleep with him
- c. *who did Sam pick up who would sleep with him
before nine?
- d. who did Sam pick up before nine who would
sleep with him?
- (101) a. Jane figured six proofs out that the circle
could not be squared before dawn
- b. Jane figured six proofs out before dawn that
the circle could not be squared
- c. *how many proofs did Jane figure out that the
circle could not be squared before dawn?
- d. how many proofs did Jane figure out before
dawn that the circle could not be squared?

Given the assumptions that wh Movement puts the preposed element in COMP, that 'extraposed' relatives and noun complements are generated by a $S \rightarrow S \bar{S}$ rule, and that their heads must be in construction with them at all levels

of the derivation, *(100c) and *(101c) are ruled out as desired. But (100d) and (101d) should be out as well, and they are grammatical. I admit that there actually is a rule of Extraposition from NP that applies after wh Movement, just as proposed by Ross. Whether this rule applies to clauses in NP outside of COMP I do not know.

This analysis requires that it be impossible for split antecedents of a relative pronoun to be wh-Moved, and this indeed we find to be the case:

- (102) a. *who is on the A team and who is on the B
team who are related?
- b. *what did you buy and what did you sell that
were of approximately equal value
- c. *what actor married and what actress divorced
yesterday who once were engaged?
- d. *who did you hug and who did you kiss who
are sisters?

These are the best examples I can find, and, fortunately, they do not quite make the grade.

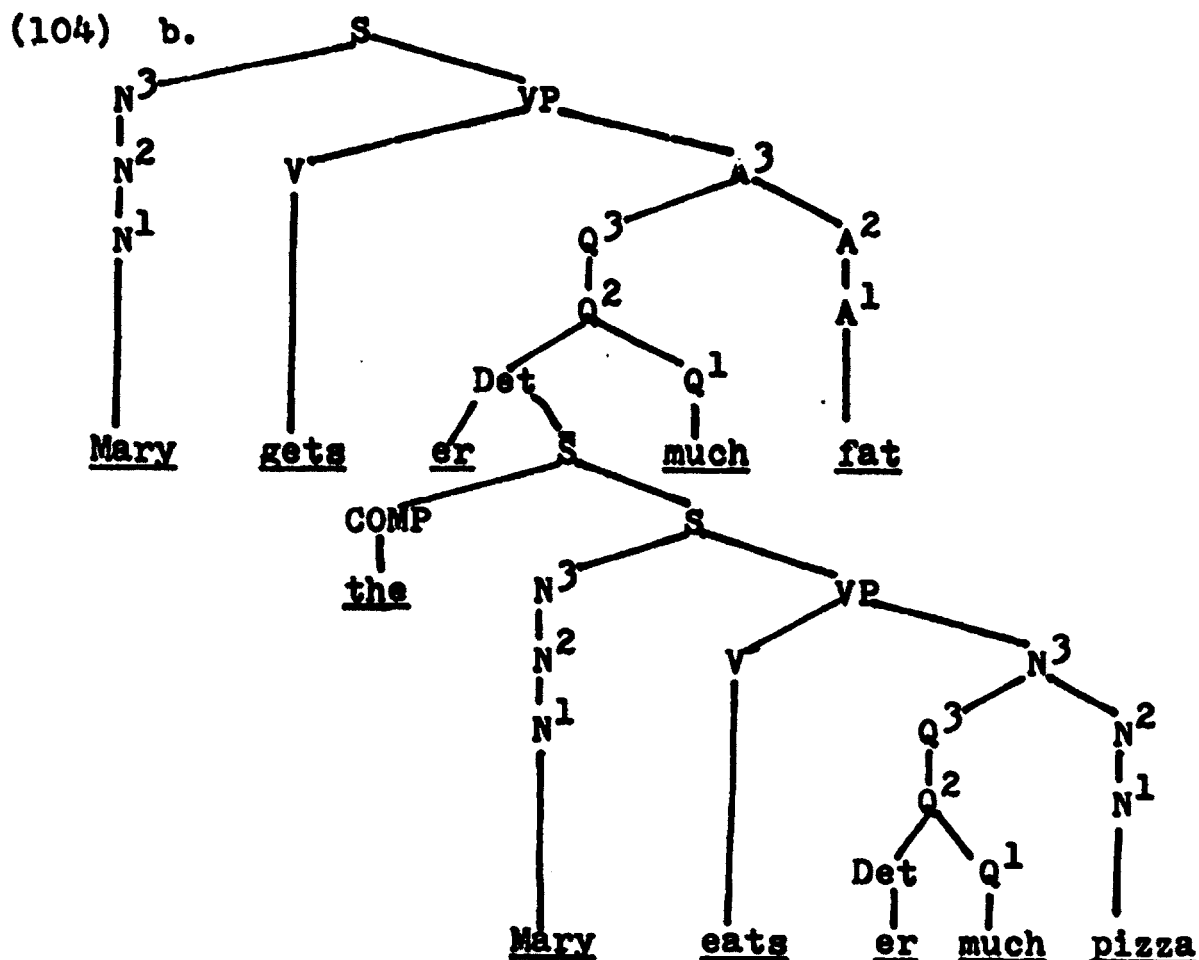
It is reasonable to ask whether noun phrase complements always extrapose, or whether they can be generated at a distance from their heads. The following example, of a form pointed out to me by Michael Szamosi, shows that complement-like clauses can hang in space next to an idiomatic S:

(103) the cat is out of the bag that Freebie's on parole.
It thus seems that complement clauses can fill the position created by the $S \rightarrow S \bar{S}$ rule. But (103) is clearly not a

noun complement. Should noun complements be generable at a distance from their heads as are relatives and comparatives, the distinction between the predicate complement system and the determiner complement system would begin to fade, which would be unfortunate (but recall Baltin's example: the proof which we discussed yesterday that Pi was irrational).

I now turn to the indefinite comparative. Thiersch (1974) proposed that the subordinate clause originated in the Det of the matrix QP. Taking the the in the subordinate clause as its complementizer, he arrives at (104b) as the structure for (104a):

(104) a. the more pizza Mary eats, the fatter she gets



The subordinate clause is then preposed by a rule that replicates the the, producing the the in the second, matrix, clause of (104).

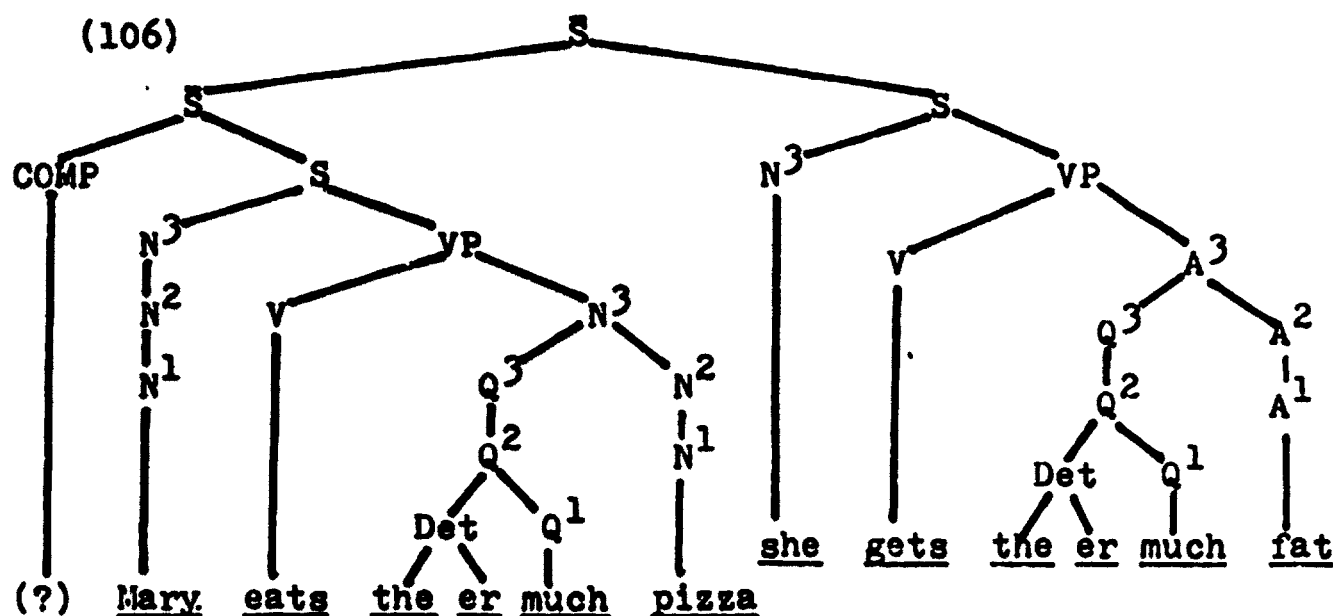
We have already seen that these the's do not occupy COMP position, but rather Det position in their associated QP. Now the fall of the Det source for comparatives makes this proposal for these constructions considerably less attractive. Enthusiasm for this wanes still further when we observe that the the-clause preposing would have to be so constrained as to move the clause to the front of the clause it had 'scope' over:

(105) a. Bill says that the more you study, the less you know

b. the more you study, the less Bill says you know.

By introducing these clauses with the $\bar{S} \rightarrow \text{COMP } (\bar{S}) \text{ S } (\bar{S})$ rule we may subsume them under the generalization noted for Marathi (section 1.1.3.5.) that anticipatory clauses go semantically on the \bar{S} there is. In fact one may say generally that relative and comparative clauses go on the S, if any, that they are sisters with.

Given this proposal, (106) is the deep structure for (104a):



Observe that preposing of the the-er determined constituent happens in both the main and the subordinate clause. This suggests that the lexicalists' multi-barrelled COMP is really more like the old notion of 'Pre-Sentence': a place where all manner of things can be put, among them complementizers in Bresnan's original sense.

Taking the indefinite comparative as analogous to

the anticipatory relative, we expect to find it in trailing position as well, and indeed we do:

- (107) a. you know the less, the more you study
 b. Mary gets the fatter, the more pizza she eats.

Observe that in the trailing construction the the-er determined constituent does not front. This structure reinforces our decision to analyse the as part of the Det of QP.

Thiersch observes a construction allied to the trailing indefinite comparative, in which the matrix does not have a the-er determiner, but an iterated comparative adjective: Mary gets fatter and fatter, the more pizzas she eats. This construction cannot be anticipatory: *the more pizzas she eats, the fatter and fatter she gets. Thiersch notes that in this construction the matrix may be uttered by one speaker and the following clause by another: A: "Mary gets fatter and fatter." B: "The more of those pizzas she eats!" The genuine indefinite comparative distinguishes itself from this construction in not being divisible between two speakers in either its trailing or its anticipatory variants:
*A: "Mary gets the fatter." B: "The more pizzas she eats!";
*A: "The more pizzas she eats" B: "The fatter Mary gets."

I would tentatively conclude that there is in addition to extraposed and trailing position at the end of the sentence something which I shall call 'afterthought position.'

A clause is essentially independent of its afterthoughts, which may be uttered by a different speaker or not at all. Nonrestrictive relatives on sentences in which, but not in as, have the properties of afterthoughts: as you know, our funds are being cut, *which you know, our funds are being cut; *A: "Ivan, our funds are being cut!" I: "as I told you they would be!", A: "Ivan, our funds are being cut!" I: "which I already knew!". as thus appears to take the anticipatory/trailing construction, while which takes the afterthought construction.

We may finally note for the comparative system a lack paralleling that pointed out earlier for the relative system: extraposed position is a clause-final position that for both comparative and relative clauses has a great deal in common with embedded-headed position. There is no clause initial position that is related to embedded position.

2.3. Global Relations: I shall now develop the theory of extra-constituent structure relations that I have frequently invoked in the preceding pages. The theory is a development of interpretive theories of anaphora as explored in such works as (Jackendoff 1972), (Wasow 1972), (Chomsky 1973) and (Fiengo 1974), and of the 'global grammar' proposed by Lakoff (1971).

There are a number of objections commonly raised against interpretive theories that I wish to meet in the present one. The first is "How do you put it together?" Interpretive theories characteristically determine such relations as coreference or quantifier scope by examination of various levels of derived structure. How is the information thus determined integrated with that determined by examination of other levels of structure so as to form a coherent level of semantic representation? It is commonplace to point out that interpretive theories are really 'global,' in the somewhat vague sense in which the word has come to be used. I shall here make fully explicit the nature of the 'globality' involved in my proposals.

Chomsky (1974-75 class lectures) has recently proposed that semantic interpretation is determined from surface structure augmented with 'traces' that mark positions from which things have been moved (see (Fiengo 1974) for discussion of traces). Liberman (1974) has shown some interesting things that can be done within

such a framework. Should the technical details of this approach prove forthcoming in a satisfactory manner, the provisions I make for globality will be unnecessary. They may, however, be eliminated with no consequences for the structure of the theory. Hence the present developments are compatible both with a traditional interpretivist outlook and with Chomsky's more recent ideas.

A more serious criticism is that interpretive rules are typically made up ad hoc for English, coming from no antecedently determined metatheory. There is therefore no clear distinction between the language-particular and the language-universal, and claims to have constrained linguistic theory by depriving the syntax of some power are evacuated by giving a wild card to the rules of interpretation. This charge is not really fair. Jackendoff writes, for example (Jackendoff 1972, pg. 380):

"This is not to say that the rules of semantic interpretation are universal, any more than the base or transformations are. It is clear, for example, that focus and presupposition are not realized with the same syntactic and phonological devices in all languages, and that reflexivization does not universally obey the constraints of English. What is claimed, rather, is that any device used to mark focus and presupposition, be it stress, syntactic position, or a focus morpheme, will be interpreted at the surface

structure, conditioning a rule which performs the same operations upon the semantic interpretation; whatever the structural conditions on reflexivization, if there is reflexivization in a language, they will be operative at the end of cycles, conditioning a rule making an entry in the table of coreference. Similarly, one might guess that certain aspects of the environment for pronominalization and reflexivization are universal; it might turn out that there are only a small number of possible options available."

In spite of this, it still must be admitted that interpretive semantics smudges the distinction between language-particular grammar and universal metatheory outside of the syntactic component: there is no serious attempt to distinguish formulations of interpretive rules from the devices that apply them. Neither can it be said that 'generative semanticists' have done well with the problem. They have frequently made assertions that 'global rules' are better than 'indexing devices,' but have not made much progress on putting satisfactory constraints on either.

In the following pages I will set up a language-universal system for imposing certain extra-constituent structure relations, which I shall call 'global relations,' on the phrase-markers in transformational derivations. Although most of the details of the system will be determined

on the basis of English, the work on relative clauses in chapter 1 provides some basis for postulating the universality of the system proposed. The system will determine the constituent structure relations of relative clauses and their heads and their relative constituents. Although many problems will remain of how languages refer to these relations in the statement of rules, the result will still be a more substantially constrained approach to the phenomena than any that I am aware of. I emphasize again that it is the fact that the mechanisms are proposed as language universals that renders them metatheoretical provisions rather than ad hoc descriptions.

There is finally the question raised by McCawley (1973) of what the objects created by interpretivist rules of 'semantic interpretation' have to do with semantics, as the term is used by logicians interested in natural language, philosophers of certain persuasions, and, increasingly, linguists. I explicitly take the position that the global relations I postulate are syntactic rather than semantic objects. They would of course, play a rule in semantic interpretation: for example, in systems of the form explored in Cooper and Parsons (1974), where rules are given for translating constituent structures into logical formulae, the global relations I develop here would tell one how to assign variables to NP and to variable-binding operators. I presume that the contribution of the global relations to

semantic interpretation would be specifiable universally for language.

2.3.1. Node Indexing: Global phenomena (such as the multi-level semantic interpretation typical of all but the most recent interpretive theories) require the introduction into syntax of some scheme of node indexing to keep track of the corresponding nodes relation.

Lakoff (1971) takes global phenomena as a warrant for sweeping reformulations in the theory of grammar. Setting aside the technical difficulties with his proposals (see Soames (1974)), I do not think that such drastic reformulations are called for. The phenomena that are solid (and involve matters internal to the derivation -- the dependencies of derivations on extra-derivational and even extra-linguistic matters being a different order of problem) can be dealt with by means of various localised alterations in the theory, in the style of Jackendoff. I shall therefore set up the corresponding nodes relation so as to make minimum, virtually null, changes in the theory of grammar.

I shall say that a phrase-marker is a well-formed terminal labelled bracketing in the sense of Peters and Ritchie (1973) (thereby discarding the original usage of the term as referring to a set of strings meeting certain conditions designed to guarantee that it determine a tree). That is, a phrase-marker is a string of terminal symbols and labelled brackets in which each bracket matches

with a bracket that has the same label. I furthermore stipulate that in indexed phrase-marker is like a phrase-marker but has the additional feature that each right bracket bears a positive integer as a superscript. Finally, a regularly indexed phrase-marker is an indexed phrase-marker in which the first right bracket has superscript 1, the second 2, and so forth.

It is clear that there is only one way of applying indices to a phrase-marker so as to get a regularly indexed phrase-marker. Therefore, instead of starting out a transformational derivation with a phrase-marker produced by the base, we can start it with the regularly indexed phrase-marker corresponding to one produced by the base (the rules of which could not supply the indices at all without being context sensitive). (108) is then a simplified regularly indexed deep structure for

John admires Mary:

$$(108) \quad [S[NP[N \text{ John}]_N^1]_{NP}^2[Aux[T \text{ Pres}]_T^3]_{Aux}^4[VP[V \text{ admire}]_V^5 \\ [NP[N \text{ Mary}]_N^6]_{NP}^7]_{VP}^8]_S^9$$

It remains to provide conventions for the preservation of node-indices under transformations.

I believe that the elementaries may be constrained to Deletion, Chomsky adjunction and Substitution. Deletion poses no problem. For the other two I propose the obvious: the node created by Chomsky adjunction bears the node index (along with all the category features) of the node adjoined to, while in Substitution the node substituted

for disappears entirely, along with its index, and is replaced by the substituting node, along with its index. I will give an example involving Substitution.

Bresnan (1972) proposed that passive sentences had underlyingly empty subjects, with the NP in the agent phrase (the logical subject) generated in that position in deep structure. Assuming this, a somewhat simplified deep structure for John is admired by Mary might be (109a), with (109b) being the structure derived from (109a) by Object Preposing:

- (109) a. $[_S[_{NP}^1[_{NP}[_{Aux}[_{T}^2[_{Pres}]^3]_{Aux}[_{VP}[_{Pass}^4[_{be}][_ {en}]]^4]_{Pass}[_{V}^5[_{admire}]^5]_{V}[_{NP}^6[_{N}^7[_{Mary}]]^6]_{NP}[_{PP}^8[_{P}^8[_{by}]]^8]_{PP}[_{NP}^9[_{N}^9[_{John}]]^9]_{NP}]^10]_{NP}]^11]_{VP}]^12]_{VP}]^13]_S]$
- b. $[_S[_{NP}^6[_{N}^6[_{Mary}]]^6]_{NP}[_{Aux}^7[_{T}^2[_{Pres}]^2]_{Aux}[_{VP}^3[_{Pass}^4[_{be}][_ {en}]]^4]_{Pass}[_{V}^5[_{admire}]^5]_{V}[_{PP}^8[_{P}^8[_{by}]]^8]_{PP}[_{NP}^9[_{N}^9[_{John}]]^9]_{NP}]^10]_{NP}]^11]_{VP}]^12]_{VP}]^13]_S]$

'*' is a special terminal hypothesized by Fiengo (1974) to be insertable by convention under any phrase node in the base. A derivation that reaches the surface with surviving '*' is ungrammatical. Hence Object preposing must apply to (109a), there being no other applicable rule that could erase the '*' (Fiengo supposes that there is a rule of agent postposing that applies in Passives, putting the subject into the *-filled NP of a by-phrase, but this is an independent matter).

Fiengo also proposes that when a constituent is moved, the symbol 't' is left in the position from

which the constituent is extracted. 't' is said to be 'bound' by the moved constituent, and if a derivation reaches the surface with a 't' (trace) which commands and precedes that which binds it, then the derivation blocks. Agent postposing thus may yield a structure exactly like (109a) with '*' replaced by 't', to which Object preposing must apply to erase the trace.

We might formalise Fiengo's proposal by recasting the deletion elementary so as to replace each maximal deleted constituent with $[_L t]_L^n$, where L is the label of that constituent and n is its index. Carrying this out in a framework in which variables are deleted is rather messy. In Fiengo's framework, the Deletion elementary is restricted to constituents, and furthermore to constituents which the transformation doing the deletion replicates elsewhere by Substitution or Chomsky adjunction.

With traces left by movement in the manner specified above, Object preposing would derive (110) from (109a):

- (110) $[_S [_{NP} [_N \text{Mary}]_N^6]_{NP}^7 [_{Aux} [_T \text{Pres}]_T^2]_{Aux}^3 [_{VP} [_{Pass} \text{be en}]_{Pass}^4 [_V \text{admire}]_V^5 [_{NP} t]_{NP}^7 [_{PP} [_P \text{by}]]_{PP}^8 [_{NP} [_N \text{John}]]_{NP}^9]_{NP}^{10}]_{PP}^{11}]_{VP}^{12}]_S^{13}$

There is a final problem connected with the rule of Right Node Raising and other potential rules applying to coordinate structures. Some of these rules perhaps have effect of fusing two constituents into one. What relation does the index of John in Bill admires, and Susan

detests, John have to do with the indices of the two occurrences of John in Bill admires John and Susan detests John. It is not clear to me what sort of operations effect Right Node Raising, so any decision here is somewhat premature, but I will venture the guess that it is the final node of the last conjunct that is raised, with the final nodes of the others being deleted. Hence the raised John will have the index of the underlying second occurrence of John.

If we now associate with a constituent structure a relation specified in the form of some sort of table composed of node-indices, we can apply transformations to the constituent structure, and the table will continue to induce the relations we desire over the constituent structures derived by the transformations. We can thus represent those properties and relations which seem to be globally present in the derivation without any significant disruption in the theory of grammar.

One might in fact claim that a node-indexing scheme was implicit in the Aspects theory of grammar, and even in that of Syntactic Structures. For in the Aspects framework the structural description of a sentence is a pair (ϕ, ψ) , where ϕ is a surface structure and ψ is its deep structure. One of the tasks of the structural description is to indicate the underlying grammatical relations between the constituents of the surface structure. It is difficult to imagine how the

structural description could accomplish this without the aid of a node-indexing scheme.

I will illustrate the technique with an oversimplified treatment of coreference. Generate a regularly indexed deep structure, take it to surface structure with the transformational component, and then set up a table of coreference as a set of ordered pairs of node-indices meeting the following conditions:

- (111) a. each index that appears in the table indexes an NP node in the surface structure
- b. the table determines an equivalence relation
- c. if $(\underline{x}, \underline{y})$ is in the table, and the node indexed by \underline{x} precedes and commands the node indexed by \underline{y} , then the node indexed by \underline{y} is a pronoun

Condition (111c) is derived from unpublished work by Howard Lasnik. A well-formed sentence structure is then a triple $(\phi, \psi, \underline{C})$, where ψ is a regularly indexed deep structure provided by the base, ϕ is derived from ψ by the transformational component, and \underline{C} is a table of coreference assigned to ψ by (111). The sentence structure can clearly determine a semantic interpretation in the desired manner.

The treatment above is of course only illustrative; it does not treat of reflexivization, for example. But the technique is obviously applicable to more sophisticated proposals, such as those of Jackendoff (1972).

There is no essential difference between this kind of treatment and one in which the relevant properties and

relations are inscribed directly into the phrase-markers, as by the 'coreference index' proposal of Aspects. I believe, however, that the present approach is somewhat more perspicuous to the mind.

It is obvious that we must specify exactly what sorts of tables are allowed in universal grammar, and how they may be tied to syntactic structure. Without such specifications a mechanism such as the one I have proposed is merely an arbitrary indexing device, allowing such absurd consequences as those pointed out by Cole (1973).

2.3.2. The Head-COMP Relation: We have seen various reasons for believing that there is some sort of relation subsisting between a relative or comparative clause and its head. There is first of all the fact that these clause^s have their heads in construction with them, even though they may be separated by an unbounded stretch of material. Next we may observe the er...than.../as...as... dependencies and the mirror-image constraint in the English comparative system, or the requirement that the head of an anticipatory relative be definite in the Indic languages discussed in chapter 1. We may also observe such paradigms as (112) (based on Vergnaud (1974: 90-93):

- (112) a. the woman started sewing and the man started
reading who had been shouting at each other
- b. a woman started sewing and a man started
reading who had been shouting at each other

c. *the woman started sewing and a man started reading who had been shouting at each other

d. *a woman started sewing and the man started reading who had been shouting at each other

Something has to squeeze these determiners into a ball in order to enforce the requirement that they be the same.

There are essentially two ways in which one might go about setting up such a system. We might say that there was a direct relation subsisting between the head and its 'equivalent' constituent in the dependent clause. We may represent this situation with the diagram (113):

(113) ...A...[SCOMP...B...]...



The \bar{S} that is the relative or comparative clause (and thereby its COMP) is uniquely identified because it is the maximal constituent dominating the 'target' (dependent) constituent but not the head.

Unfortunately many of the properties of comparatives are replicated by result clauses and infinitive complements of too; so...that... and too...for... present the same selection problem as to er...than... and as...as... . We may furthermore see that these constructions also obey the mirror-image constraint:

(114) a. so many more people than I invited that I couldn't count them came to the party

b. *so many more people that I couldn't count them than I invited came to the party

c. so many more people than I invited came to the party that I couldn't count them

- d. *so many more people that I couldn't count
them came to the party than I invited
 - e. so many more people came to the party than
I invited that I couldn't count them
 - f. *so many more people came to the party that
I couldn't count them than I invited
- (115)
- a. too many more people than I invited for us
to count came to the party
 - b. *too many more people for us to count than I
invited came to the party
 - c. too many more people than I invited came to
the party for us to count
 - d. *too many more people for us to count came
to the party than I invited
 - e. too many more people came to the party
than I invited for us to count
 - f. *too many more people came to the party for
us to count than I invited

We therefore need a relation that holds between between
the clause and its head.

Since the morphology of the COMP and the morphology
of the Det of the head are interdependent, I will represent
the relation as holding between the Det of the head and
the COMP of the clause, and call the relation the Head-
COMP relation.

Questions with wh-words are in many ways analogous
to relative clauses. But since questions lack heads,
we could not use a head-target constituent relation to
identify the target constituents of a question in the
fashion of (113). Rather there must be a relation
(usually formalized as co-indexing) between the COMP of

the question and its target constituent. Let this relation be called the COMP-target relationship. If we assume that it subsists in relative clauses as well as in interrogatives, we may replace (113) with (116):

$$(116) \quad \dots A \dots [\underbrace{S}_{\text{COMP}} \dots B \dots] \dots$$

(113) and (116) are pretty much the most economical way to represent the necessary relations for relative and comparative clauses, and when we look at more clause types (116) turns out to require the fewest sorts of primitive relations. In this subsection I will develop the axioms for the Head-COMP relation, and in the next those for the COMP-target relation.

We have seen that a COMP can have a whole set of heads. Hence we want the Head-COMP table (referred to henceforth as H) to consist of a set of n -tuples $(\underline{x}, \underline{y}_1, \dots, \underline{y}_n)$ where \underline{x} is the index of a COMP node and $\underline{y}_1, \dots, \underline{y}_n$ are the indices of Det nodes. We will want an axiom to enforce the requirement that the heads are in construction with but not contained by the S of the COMP. This is achieved by (117b) below. We may secondly observe that a Det can be head for only one COMP, and I will also suppose that for each COMP there is only one entry. This is accomplished by (117c). I thus give the following principles governing the assignment of a Head-COMP table to an indexed phrase-marker:

(117) For an indexed phrase-marker ϕ , H is a well-formed Head-COMP table only if

$$H = \left\{ \begin{array}{c} (\underline{x}_1, \underline{y}_{1,1}, \dots, \underline{y}_{1,\underline{m}_1}), \\ \vdots \\ (\underline{x}_n, \underline{y}_{n,1}, \dots, \underline{y}_{n,\underline{m}_n}) \end{array} \right\}$$

where

- (a) for $\underline{i} = 1, \dots, \underline{n}$, \underline{x}_i is the index of a COMP in ϕ and for $\underline{j} = 1, \dots, \underline{m}_i$, $\underline{y}_{i,j}$ is the index of a Det in ϕ .
- (b) if $(\underline{x}, \underline{y}_1, \dots, \underline{y}_m) \in H$, then the nodes indexed by $\underline{y}_1, \dots, \underline{y}_m$ are not dominated by the node immediately dominating the node indexed by \underline{x} , but they are dominated by the node immediately dominating that node.
- (c) H mentions no index twice.

(117) captures the major structural conditions. To actually rule sentences out, however, we need an additional mechanism to enforce some requirements of consistency.

(Emonds 1970), (Chomsky 1973) and (Vergnaud 1974) have proposed analyses in which COMP is treated as an increasingly complex node, expanding into a wide variety of things. I shall develop this further by supposing that there is a 'place' in COMP wherein are placed the features of the determiners that the COMP may take as head. Whether this 'place' should be treated as a constituent or as a new kind of feature I do not really know. I shall take the latter course. I shall represent it as a symbol $[\pm F_1 \dots \pm F_k]_D$, where the $\pm F_i$ are the features over which

consistency is enforced. This symbol may be treated as a component of the label of the COMP brackets. By requiring the $[...]_D$ symbol to be featurally nondistinct from those of the determiners of the heads, we require these determiners to all have the same composition, and furthermore permit that composition to determine the formative used to spell the COMP. This solves the problem of the er...than.../as...as... selectional dependencies.

We may also observe that some clauses, such as English comparatives, or ordinary English relatives, require heads, while others, such as ordinary Navajo relatives, do not. We thus may suppose that there is in COMP a universal feature $[+Hd]$. A COMP that is $[+Hd]$ must have a head; one that is $[-Hd]$ does not have a head. I propose that the $[...]_D$ symbol is present regardless of whether or not there is a head.

Formally, we may capture these requirements as follows:

- (118) If ϕ is a phrase marker, and H is a well formed Head-COMP table for ϕ , then
- (a) if x is the index of a $[+COMP +Hd]$ node in ϕ , then there are y_1, \dots, y_m such that (x, y_1, \dots, y_m) is an element of H
 - (b) if (x, y_1, \dots, y_m) is an element of H then the node indexed by x is $[+Hd [...]]_D$, where ' $[...]$ ' is non-distinct from the node indexed by each y_i , $i = 1, \dots, m$.

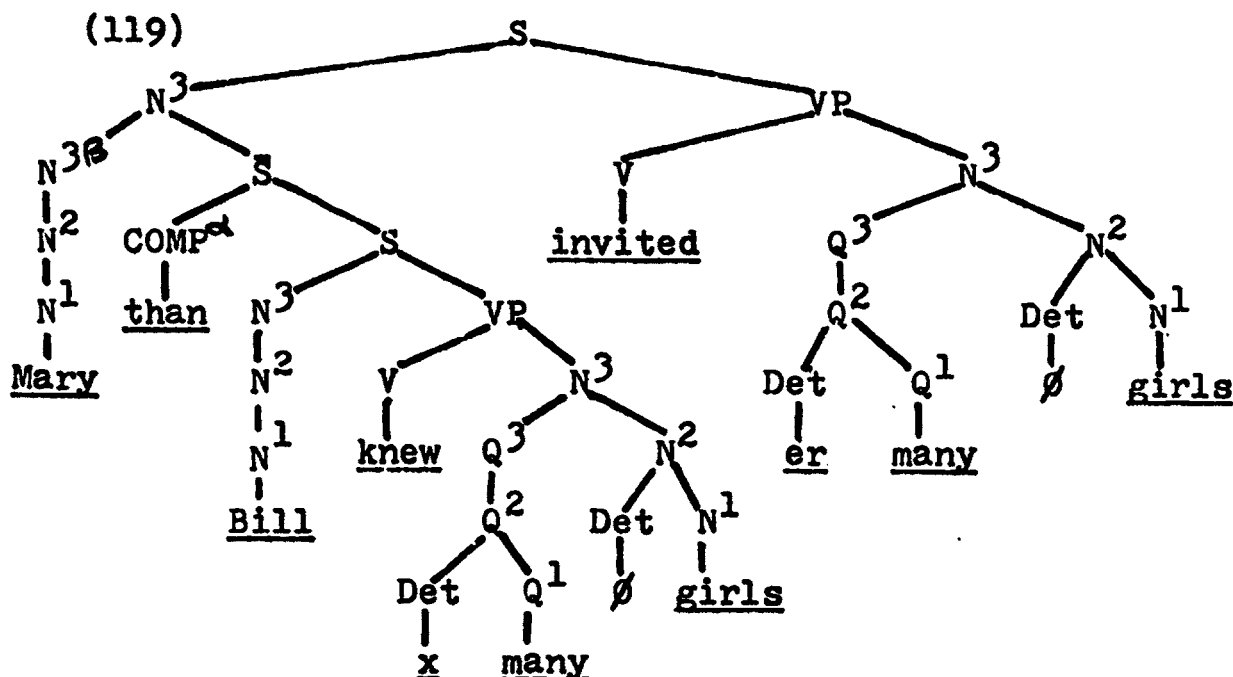
Finally, we must propose a feature system. I shall

first distinguish nominal determiners from QP determiners by having the former be [+ND -QD] and the latter [-ND +QD]. Amongst the nominal determiners, the is of course [+Def] while a, etc., is [-Def]. Amongst the QP determiners er and as will be [+Cm -Rs] and too and so will be [-Cm +Rs]. Finally er will be [+~~Ex~~] and as will be [-~~Ex~~], while too will be [+Ex] and so will be [-Ex]. My choices here are somewhat arbitrary, serving merely to distinguish from each other the formatives involved, and to impose upon them an intuitively reasonable classification. At present I would not suppose that these features are at all the correct ones. I do believe, however, that the correct features should be taken as belong to some language-universal feature framework. Much more work in various languages would be required to acquire a real understanding of the kind of feature-system necessary.

We can now see that we need merely specify that than goes into a [+COMP +Hd [-ND +QD +Cm -Rs +~~Ex~~]_D] node in order to state the fundamental facts of its distribution. The other complementizers may be dealt with in a precisely comparable fashion. The feature +R introduced in Chapter 1 to distinguish the complementizers of relative clauses may be taken to be a symbol for [+ND -QD ...]_D.

We are now in a position to rule out some sentences. I shall first consider an example in which a comparative clause occurs in an S together with a QP that has the

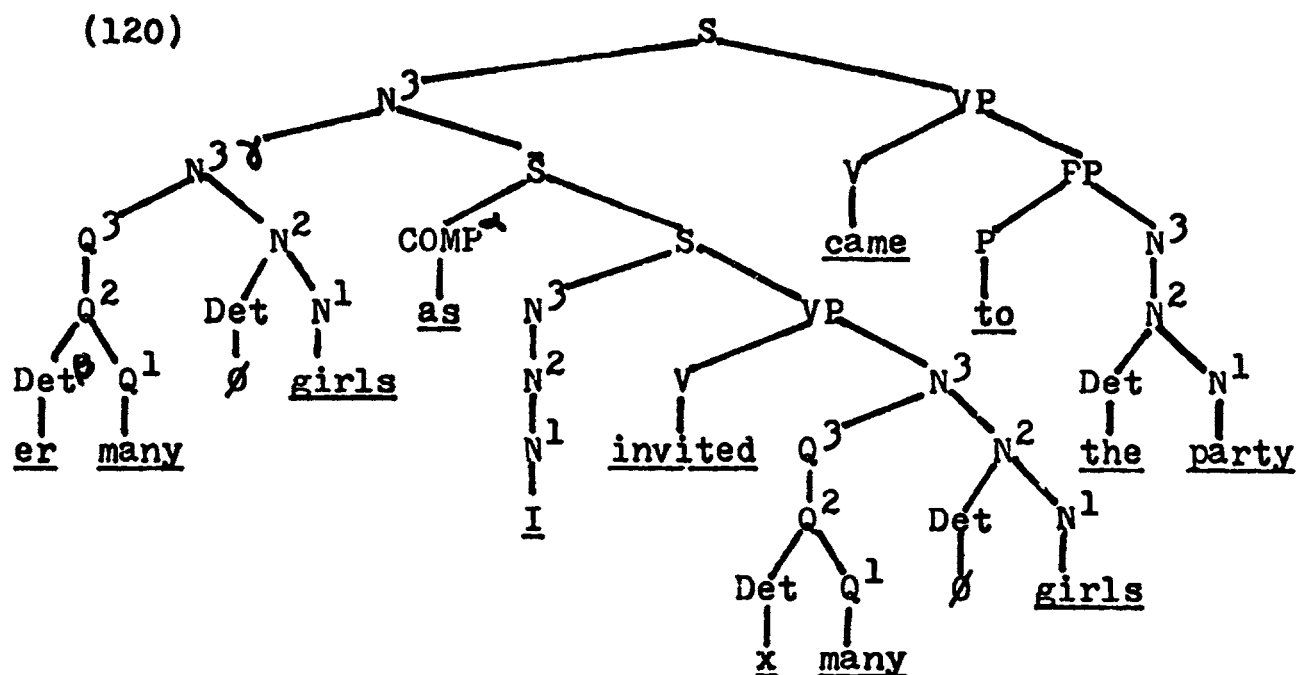
appropriate determiner, but the clause is not in construction with the QP:



I have left out various inessential nodes, and given only certain crucial node-indices in the form of Greek-letter superscripts.

By the lexicon, α must be $[+COMP +Hd]$. But then, by (118a), there must be $(\underline{x}, \underline{y}_1, \dots, \underline{y}_n) \in \underline{H}$ such that $\underline{x} = \alpha$, and by (117a) the nodes indexed by $\underline{y}_1, \dots, \underline{y}_n$ must be $[+Det]$. But by (117b) they must be in β , and there are no such nodes in β . Therefore the structure has no Head-COMP table that satisfies the required conditions, and the sentence *Mary than Bill knew girls) invited more girls is ruled out. QED.

Another example, in which the constituent structures are O.K. but the determiners and complementizers do not agree properly is (120):



By the lexicon, α will be $[+COMP +Hd [-ND +QD +Cm -Rs -\neq]_D]$.

But by (118a) there must be $(\alpha, y_1, \dots, y_m) \in H$, where

y_1, \dots, y_m index determiners within γ . β is the only

candidate. But β is $[-ND +QD +Cm -Rs +\neq]$, so it disagrees

with α , and therefore condition (118b) cannot be met.

Hence the sentence *more girls as I invited came to the party has no well formed Head-COMP table and is therefore ungrammatical.

Now let us consider the mirror-image constraint.

(121) is a typical acceptable structure and (122) is a typical violation:

(121) as many er many people than I invited as you
 predicted came to the party

(122) *as many er many people as you predicted than I
 invited came to the party

There are sufficiently many other string-tangling phenomena in syntax to make a formulation of the constraint premature (or trivial). I merely observe that the Head-COMP relation provides the strings to tangle.

Multiple headed comparatives and result clauses are compatible with the principles (117-118). They enforce the requirement that the determiners all be the same. That this is correct is evidenced by (123):

- (123) a. fewer people moved more cinder blocks this time than ever before
- b. as many people moved as many cinder blocks this time as ever before
- c. *as many people moved more cinder blocks this time as/than ever before.

Note the inexplicable *as few people moved as many cinder blocks this time as ever before. This somewhat casts into doubt the significance of (123).

More interesting cases of the consistency requirement being enforced are those involving relatives, since here there is no overt formative in the COMP that is selected on the basis of what appears in the determiners of the head. Relative clauses also give some evidence with regard to what features the consistency requirement is to be enforced over. (124) is grammatical:

- (124) one man came in and three women went out who were related.

Yet the Det of one man is [+Sg] and that of three women is [-Sg]. This shows that \pm Sg is not specified in [...]_D.

This leads to an immediate prediction: because $\pm\text{Def}$ appears in [...]_D, there will be languages in which there are complementizers that require definite heads, and because $\pm\text{Sg}$ is not in [...]_D there will not be languages in which there are complementizers that require singular heads. As far as I know, both of these predictions are borne out. In Navajo (sections 1.1.2.1., 1.1.3.6.) the complementizer ígíí/éé is only used to form definite descriptions, whether in the internal head, pre-relative or extraposed relative construction. We may thus specify ígíí/éé in the lexicon as being [+COMP [+ND -QD +Def]_D], leaving it unspecified with respect to $\pm\text{Hd}$ (the features that specifies whether there is a head or not). English contains a near miss to the claim that no languages have complementizers that select a certain number on their heads in the form of the paucal relative clause (section 1.1.2.2.).

The reader may well be suspicious about one of the properties of (117): (117a) involves a crucial mention of the category 'Det.' Our suspicions deepen when we note that there are words such as sufficient/sufficiently, that are clearly A, and enough, which the $*Q^0 A^0$ Filter shows to be a Q (tall enough, *enough tall, different enough, enough different), that take for (and maybe sometimes that) complements just as does too.

Reflecting on this problem leads us to an important

revision in (117-118). Why not say that the COMP is connected not to a Det, but to a [-COMP] node bearing a [...]D feature. The consistency requirement is then merely that the constants of the two [...]D features be identical (or perhaps nondistinct).

Making this move, we can form a unified reformulation of (117, 118), combining (117a) and (118b):

- (125) For an indexed phrase-marker ϕ , H is a well-formed Head-COMP table only if

$$H = \left\{ (\underline{x}_1, y_{1,1}, \dots, y_{1,m_1}), \right. \\ \vdots \\ \left. (\underline{x}_n, y_{n,1}, \dots, y_{n,m_n}) \right\}$$

where

- (a) for $i = 1, \dots, n$, \underline{x}_i is the index of a [+COMP +Hd [...]D] node in ϕ and for $1 \leq j \leq m_i$, $y_{i,j}$ is the index of a [-COMP [---]D] node such that ... is identical to ---
- (b) if $(\underline{x}, y_1, \dots, y_m) \in H$, then the nodes indexed by y_1, \dots, y_m are not dominated by the node immediately dominating the node indexed by \underline{x} , but they are dominated by the node immediately dominating that node
- (d) no index is mentioned twice in H
- (e) if \underline{x} is the index of a [+COMP +Hd] node in ϕ , then there are y_1, \dots, y_m such that $(\underline{x}, y_1, \dots, y_m) \in H$.

We may classify a node that as a [...]D symbol as [+D], and one that lacks one as [-D]. [+D] is then the feature borne by those elements that participate in the determiner

complement system, be they determiners or not. 'D' may be thought of as something that is either absent, or present in a variety of forms (but not, of course, being absent in a variety of forms).

At what level of the derivation does (125) hold? one possibility is that it holds only at surface structure. In this case, our elimination of the 'Det' specification was well advised, for er Shift surely removes the Det node from over er. Under our new treatment, however, it need only be assured that er Shift moves the $[...]_D$ specification onto the Q: more can then be treated like enough.

If semantic interpretation can be determined entirely off of surface structure, then we can effect a grand simplification of the theory by simply eliminating the indices, and building H out of occurrences of substrings in the labelled bracketing that is the surface structure. There is another interesting possibility, however, which is to claim that (125) holds for H throughout a derivation. One would generate an indexed deep structure, supply a Head-COMP table, check to see if (125) was satisfied, and then in the derivation recheck after each rule has applied. (125) would then serve to prohibit a wide variety of derivational shenanigans.

I have sought to explain some phenomena by means of

the hypothesis that there is in COMP something, I shall call it a complex feature, that recapitulates the determiner of the head, or, more accurately, the determiner-like aspect of the head. When there is no head this complex feature performs the function that the head's determiner would perform. We are saying then that it is in some sense essential for the relative clause to have a determiner, and that it is the same as the determiner of the head, if there is any. This is not a new idea in linguistics, being one of the central proposals in Benveniste's classic (1957) article on the relative clause.

2.3.3. The COMP-Target Relation: To complete the picture, it remains to set up the relation that holds between COMP and the target constituents. This relation can be set up as a table \underline{T} of sequences, similar to \underline{H} , the head-COMP table, but obeying somewhat different conditions. From the existence of multiple wh word questions and relative clauses we can see the necessity for a COMP to have several targets. But clearly a target is related to only one COMP. There is the further requirement that the target(s) be contained within the \bar{S} of the COMP.

These principles may be given a preliminary form as (125):

(126) For an indexed phrase marker ϕ , \underline{T} is a well-formed COMP-Target table only if

$$\underline{T} = \left\{ \begin{array}{l} (\underline{x}_1, \underline{y}_{1,1}, \dots, \underline{y}_{1,m_1}) \\ \vdots \\ (\underline{x}_n, \underline{y}_{n,1}, \dots, \underline{y}_{n,m_n}) \end{array} \right\}$$

where

- (a) for $i = 1, \dots, n$, \underline{x}_i indexes a COMP in ϕ
for $j = 1, \dots, m_i$, $\underline{y}_{i,j}$ indexes a Det in ϕ
- (b) If $(\underline{x}, \underline{y}_1, \dots, \underline{y}_m) \in \underline{T}$, then the node immediately dominating the node indexed by \underline{x} dominates the nodes indexed by $\underline{y}_1, \dots, \underline{y}_m$
- (c) no index is mentioned twice in \underline{T} .

(126) is obviously parallel to (117).

(126) is by itself insufficient. We need something

comparable to (118) to permit the lexical entries of formatives to specify that the formative is a relative pronoun, an interrogative, or whatever. We find, furthermore, something analogous to a consistency requirement: in the great majority of languages the relative pronoun is different in form from the interrogative. Hence the relative/interrogative pronoun choice is varying with the R/Q choice in the complementizer. I thus posit a complex feature 'W', which may contain the specification '+Q' for 'interrogative,' and '-Q' for relative. A relative complementizer will have the feature composition $[+COMP [-Q]_W]$, an interrogative complementizer (for a wh word question) will have the composition $[+COMP [+Q]_W]$, a relative pronoun will be $[-COMP [-Q]_W]$ and an interrogative will be $[-COMP [+Q]_W]$.

We can thus formulate (127), parallel to (125):

- (127) For an indexed phrase marker ϕ , T is a well-formed COMP-Target table only if

$$T = \left\{ \begin{array}{l} (\underline{x}_1, y_{1,1}, \dots, y_{1,m_1}), \\ \vdots \\ (\underline{x}_n, y_{n,1}, \dots, y_{n,m_n}) \end{array} \right\}$$

where

- (a) for $i = 1, \dots, n$, \underline{x}_i indexes a $[+COMP [\dots]_W]$ node and for $j = 1, \dots, m_i$, $y_{i,j}$ indexes a $[-COMP [---]_W]$ node such that ... is the same as ---.

- (b) If $(\underline{x}, \underline{y}_1, \dots, \underline{y}_m) \in \underline{T}$, then for $\underline{i} = 1, \dots, \underline{m}$, the node immediately dominating the node indexed by \underline{x} dominates the node indexed by \underline{y}_i .
- (c) no index is mentioned twice in \underline{T}
- (d) If \underline{z} indexes a node that is $[[\dots]_W]$, then there are $\underline{x}, \underline{y}_1, \dots, \underline{y}_m$ such that $(\underline{x}, \underline{y}_1, \dots, \underline{y}_m) \in \underline{T}$ and either $\underline{z} = \underline{x}$ or for some \underline{i} , $1 \leq \underline{i} \leq \underline{m}$, $\underline{z} = \underline{y}_i$.

I leave open the full range of contents of the $[[\dots]_W]$ complex feature.

We can now specify the features we have used in the lexical entries for various pronouns so as to characterize their uses. English wh, for example, is $[-\text{COMP} +W]$. Modern Greek o opíos (a relative pronoun that cannot be used as an interrogative) is $[-\text{COMP} [-Q]_W]$.

We may deal with multiple headed constructions on the basis of the observation that multiple headed relative clauses either have several antecedents for one relative pronoun, or one antecedent for each relative pronoun. We do not find analogues to the teratology (128):

- (128) *a man_i killed a woman_j and a boy_h kissed a girl_k
 which males_{i,h} were in love with which_{j,k} females.

The following principle may therefore be proposed:

- (129) If ϕ is an indexed phrase marker with Head-COMP table \underline{H} and COMP-Target table \underline{T} , then if $(\underline{x}, \underline{y}_1, \dots, \underline{y}_n) \in \underline{H}$ and $(\underline{x}, \underline{z}_1, \dots, \underline{z}_m) \in \underline{T}$, either $\underline{m} = 1$ or $\underline{m} = \underline{n}$.

(129) enforces the restriction that in a relative clause with several wh words, each has its own head.

There are many ways in which one could continue to tighten up the system so as to capture well-known constraints. The 'strong crossover principle' that Crow (section 1.2.1.1.) reveals to apply to wh-marking is an obvious candidate, and so is Chomsky's (1973) constraint that a wh word that is in a COMP is interpreted as bound by that COMP. I shall restrict myself to getting the system to recognize the major constituent structure types.

We may clearly discern three important kinds of relative clauses: the anticipatory and trailing relatives, the pre-, post- and extraposed relatives, and the headless relatives. I shall assume here that the pre- and post-relatives are all underlyingly what they are on the surface, hence rejecting the extraction analysis. (observe that under the extraction analysis the situation would arise in which the surface structure head and NP_{rel} would have the same node index: thus the various the's in the well-formedness relations for the tables would suffer from presupposition failure. I can see no problem in replacing all these the's with a's). Comparative clauses fall into the first two families. I shall call the first family the adjoined clauses, the second the headed embedded, and the last the headless, 'as suggested' in section 1.1.3.

We wish to explain the fact that typically wh words

and complementizers are useable in one, but not all of the three types of clauses. We further see in the indefinite comparative reason to believe that NP_{rel} and NP_{hd} share some complex feature.

I shall suppose that NP_{rel} shares the $[...]_D$ feature of its controlling COMP. This may be enforced by the following stipulation:

- (130) If ϕ is a phrase marker with a well-formed COMP-Target relation \underline{T} , and if for $(\underline{x}, \underline{y}_1, \dots, \underline{y}_m) \in \underline{T}$ and for $i = 1, \dots, m$, then the node indexed by \underline{x} agrees with the node indexed by \underline{y}_i on the composition of $[...]_D$.

I then suppose the various positional environments to impose a feature on the $[...]_D$ of the COMP of the relative clause. By (130), these specifications are also enforced in NP_{rel} and NP_{hd} , and so can influence the form of determiners, etc.

The three families may be distinguished with the features $\pm Ad$ and $\pm At$. Anticipatory and trailing relatives are $[+Ad -At]$. Clause generated by a rule of the form $X \rightarrow X \bar{S}$ or $X \rightarrow \bar{S} X$ are $[-Ad +At]$. Finally, clauses generated by $X \rightarrow \bar{S}$ (headless clauses) are $[-Ad -At]$. Putting this in symbols we get (131):

- (131) If a $[+COMP [-Q]_w]$ node is immediately dominated by
- (a) an \bar{S} immediately dominated by \bar{S} , then it is also $[+Ad -At]_D$.
 - (b) an \bar{S} immediately dominated by an X and sister to an X (where X is a category variable), then it is also $[-Ad +At]_D$

- (c) an \bar{S} immediately dominated by X and sister to nothing, then it is also $[[-Ad -At]_D]$.

We may now distinguish some words by their featural specifications. Relative which is specified as $[-COMP [-Q]_w [+ND -QD -Ad +A]_D]$. the er is $[-COMP [-ND +QD +Ad -At]_D]$. Bresnan's 'x' determiner is $[-COMP [-Q]_w [-ND +QD -Ad +At]_D]$.

Before closing the section and the chapter, I will describe briefly some principles that would assist a language learner in sorting out these types on the basis of minimal evidence. First, consider the extraposed versus the trailing clauses. Trailing clauses characteristically can appear in anticipatory position, but there is no matrix initial position for extraposed clauses. Note that it is also the case for afterthought clauses. If we suppose that intonation patterns suffice to distinguish after thought from extraposed clauses, then we can discern the trailing clauses to be the non-after thought clauses that never appear matrix initially. I suspect that intonation would also serve to distinguish extraposed from trailing clauses, which suggests that these positional facts are not really relevant to language-learning.

We have also observed a general principle that in a clause introduced by an $X \rightarrow X \bar{S}$ or $X \rightarrow \bar{S} X$ rule, which I shall also call an attached relative, NP_{rel} must usually be a pronoun, with Japanese being an apparent exception to this. We may establish a principle that

includes Japanese under a non-extraction analysis (see section 1.3.1) by stipulating that in an attached relative structure NP_{rel} be anaphoric to NP_{hd} in the sense of Wasow (1972). It is a basic principle of anaphora that if NP A is anaphoric to NP B, then A must be more general than B. In the typical anticipatory relative, NP_{rel} is less general (i.e., is an NP like wh-horse), while NP_{hd} is just a pronoun. Hence the typical anticipatory relative cannot be misanalysed as a pre-relative without leading to violations of universal conditions.

There is a final consequence that we can extract from the anaphoricity condition. (Vergnaud 1974) observes a constraint that a pronoun cannot be anaphoric to a containing NP. Hence (132) are ungrammatical:

- (132) a. *the fact_i that it_i was discovered is amazing
 b. *pictures_i of collectors of them_i are on the wall

This condition, together with the condition that NP_{rel} of an attached relative clause be anaphoric to NP_{hd} requires that an embedded relative attached to an NP be introduced by $NP \rightarrow NP \bar{S}$: for $NOM \rightarrow NOM \bar{S}$, $N \rightarrow N \bar{S}$ would not provide for NP_{rel} an NP_{hd} that did not dominate it. Hence solely on the basis of examples like the boy who died, etc., we are forced to get the $NP \rightarrow NP \bar{S}$ rule, which provides the constituent structure needed for the examples like the boy and the girl who were engaged.

The system of relations would thus appear to permit

one to formulate principles that contribute in a demonstrable way towards making relative clause construction in principle learnable.

Footnotes to Chapter 2

1. Much of the material in this chapter is based on this article, which I shall henceforth refer to as merely 'Bresnan.' I am heavily indebted to Joan Bresnan and Mark Liberman for discussions of many of the subjects treated here.
2. I am indebted to Dorothy Siegel for uttering thus example, and to Mark Liberman for pointing out that she had.

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